# 2007 Mazda CX-7 Workshop Manual

**FOREWORD**

This manual contains on-vehicle service and/or diagnosis procedures for the Mazda CX-7.

For proper repair and maintenance, a thorough familiarization with this manual is important, and it should always be kept in a handy place for quick and easy reference.

All the contents of this manual, including drawings and specifications, are the latest available at the time of printing.
As modifications affecting repair or maintenance occur, relevant information supplementary to this volume will be made available at Mazda dealers. This manual should be kept up-to-date.

Mazda Motor Corporation reserves the right to alter the specifications and contents of this manual without obligation or advance notice.

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**Mazda Motor Corporation**
**HIROSHIMA, JAPAN**

APPLICATION:
This manual is applicable to vehicles beginning with the Vehicle Identification Numbers (VIN), and related materials shown on the following page.

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# VEHICLE IDENTIFICATION NUMBERS (VIN)

**JM3 ER29L*7# 100001—**
**JM3 ER293*7# 100001—**

# RELATED MATERIALS

| Material Name | MNAO Part No. | Mazda Material No. |
|---|---|---|
| Mazda CX-7 2007 Service Highlights | 9999–95–045F–07 | 3416–1U–06B |
| Engine Workshop Manual L3 WITH TC | 9999–95–0L3T–06 | 1833–1U–05H |
| Automatic Transaxle and Transfer Workshop Manual AW6A-EL AW6AX-EL | 9999–95–0AW6–07 | 1874–1U–06B |
| Mazda CX-7 Bodyshop Manual | 9999–95–093F–07 | 3419–1U–06C |
| Mazda CX-7 2007 Wiring Diagram | 9999–95–068G–07 | 5666–1U–06B |

# GENERAL INFORMATION

**00**
SECTION



**GENERAL INFORMATION . . . . 00-00**

## 00-00 GENERAL INFORMATION

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## VEHICLE IDENTIFICATION NUMBER (VIN) CODE

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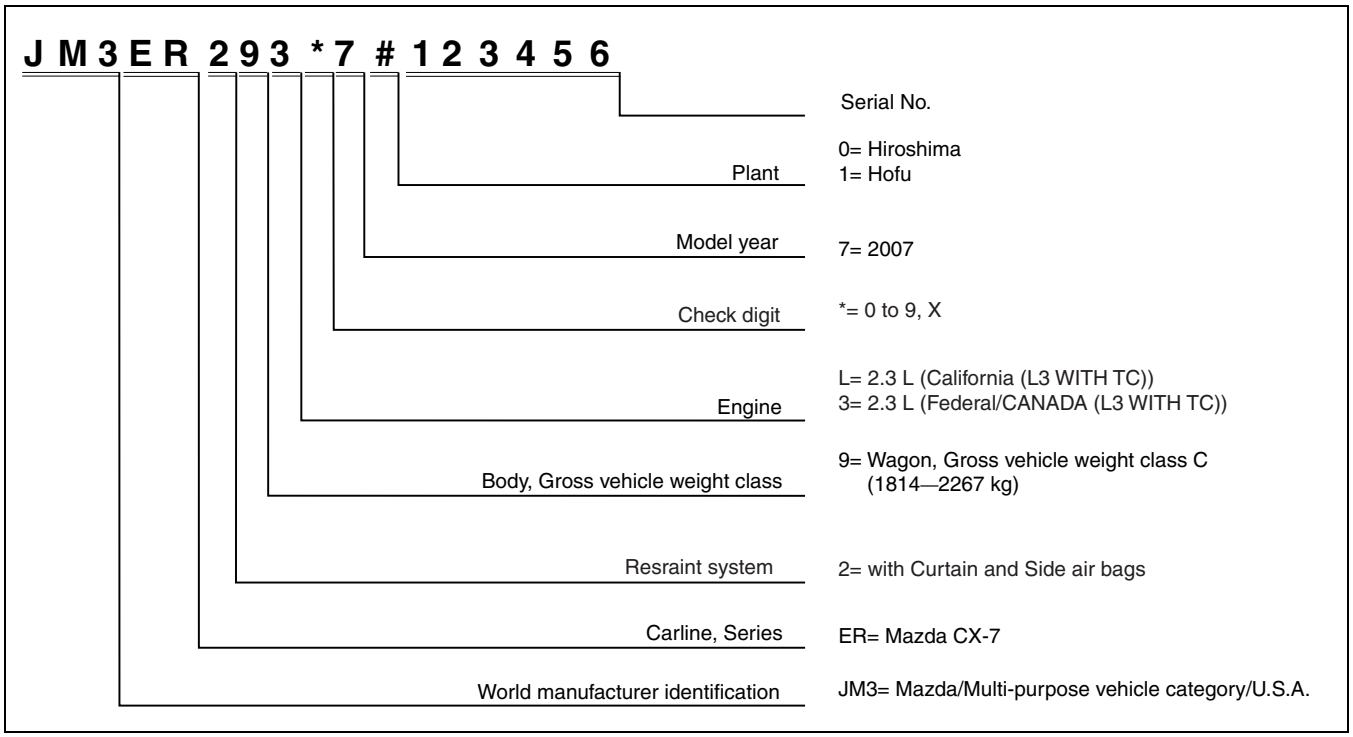


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## VEHICLE IDENTIFICATION NUMBER (VIN)

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JM3 ER29L*7# 100001—
JM3 ER293*7# 100001—

## HOW TO USE THIS MANUAL

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### Range of Topics

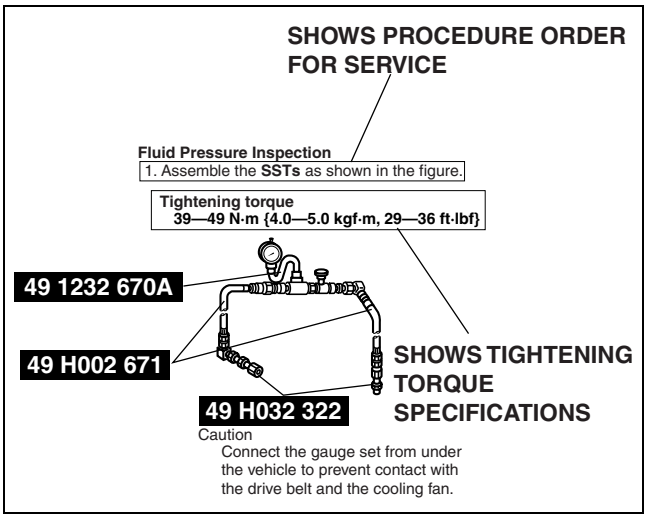
- This manual contains procedures for performing all required service operations. The procedures are divided into the following five basic operations:
  — Removal/Installation
  — Disassembly/Assembly
  — Replacement
  — Inspection
  — Adjustment
- Simple operations which can be performed easily just by looking at the vehicle (i.e., removal/installation of parts, jacking, vehicle lifting, cleaning of parts, and visual inspection) have been omitted.



### Service Procedure

#### Inspection, adjustment

- Inspection and adjustment procedures are divided into steps. Important points regarding the location and contents of the procedures are explained in detail and shown in the illustrations.

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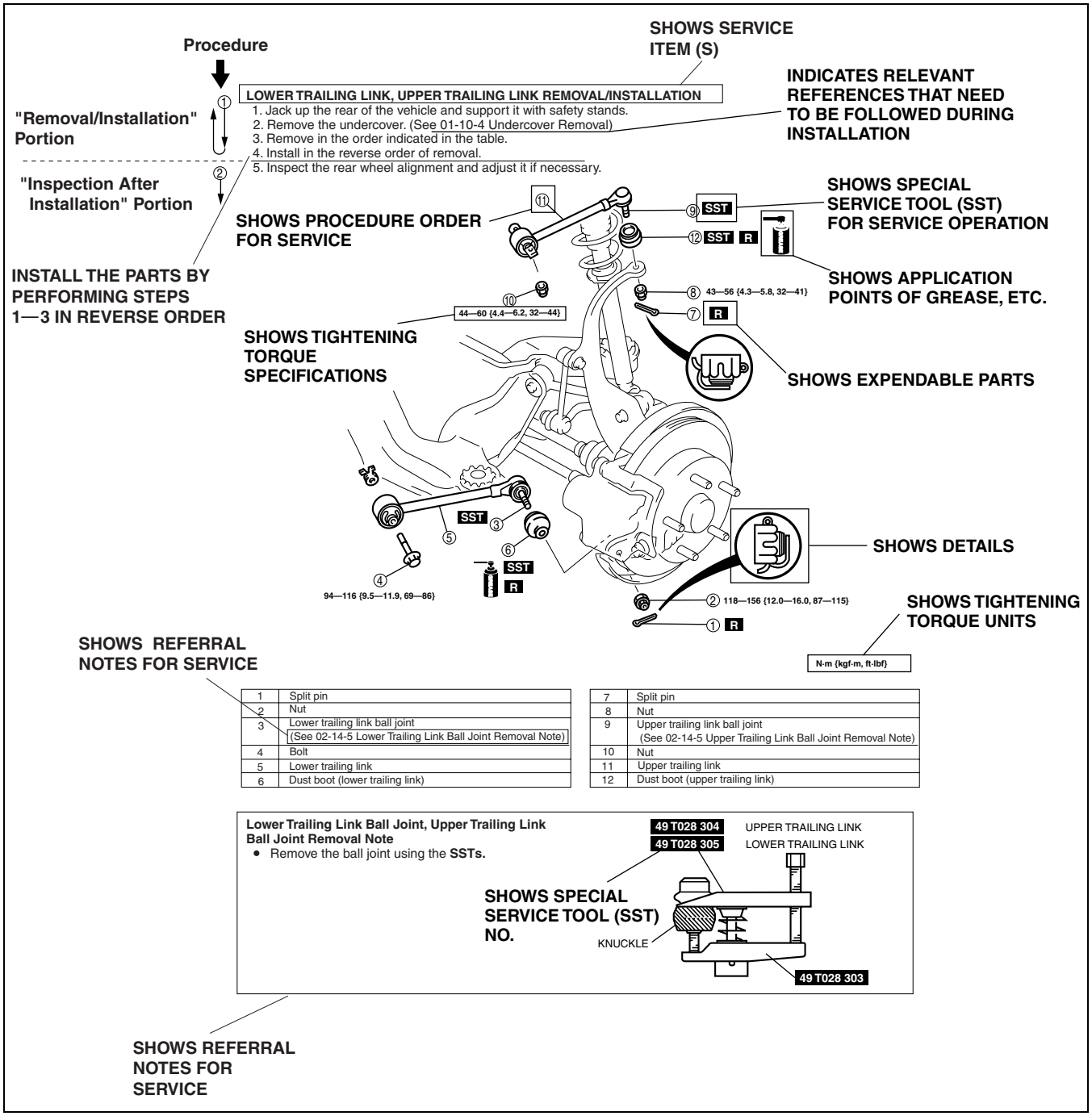
**Repair procedure**

1. Most repair operations begin with an overview illustration. It identifies the components, shows how the parts fit together, and describes visual part inspection. However, only removal/installation procedures that need to be performed methodically have written instructions.
2. Expendable parts, tightening torques, and symbols for oil, grease, and sealant are shown in the overview illustration. In addition, symbols indicating parts requiring the use of special service tools or equivalent are also shown.
3. Procedure steps are numbered and the part that is the main point of that procedure is shown in the illustration with the corresponding number. Occasionally, there are important points or additional information concerning a procedure. Refer to this information when servicing the related part.




| | |
|---|---|
| 1 | Split pin |
| 2 | Nut |
| 3 | Lower trailing link ball joint (See 02-14-5 Lower Trailing Link Ball Joint Removal Note) |
| 4 | Bolt |
| 5 | Lower trailing link |
| 6 | Dust boot (lower trailing link) |

| | |
|---|---|
| 7 | Split pin |
| 8 | Nut |
| 9 | Upper trailing link ball joint (See 02-14-5 Upper Trailing Link Ball Joint Removal Note) |
| 10 | Nut |
| 11 | Upper trailing link |
| 12 | Dust boot (upper trailing link) |

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**Symbols**

- There are eight symbols indicating oil, grease, fluids, sealant, and the use of **SST or equivalent. use. These symbols show application points or use of these materials during service.**

| Symbol | Meaning | Kind |
|---|---|---|
| | Apply oil | New appropriate engine oil or gear oil |
| | Apply brake fluid | New appropriate brake fluid |
| | Apply automatic transaxle/ transmission fluid | New appropriate automatic transaxle/ transmission fluid |
| | Apply grease | Appropriate grease |
| | Apply sealant | Appropriate sealant |
| Ⓟ | Apply petroleum jelly | Appropriate petroleum jelly |
| R | Replace part | O-ring, gasket, etc. |
| SST | Use SST or equivalent | Appropriate tools |

**Advisory Messages**

- You will find several **Warnings, Cautions, Notes, Specifications and Upper and Lower Limits in this manual.**

**Warning**

- A Warning indicates a situation in which serious injury or death could result if the warning is ignored.

**Caution**

- A Caution indicates a situation in which damage to the vehicle or parts could result if the caution is ignored.

**Note**

- A Note provides added information that will help you to complete a particular procedure.

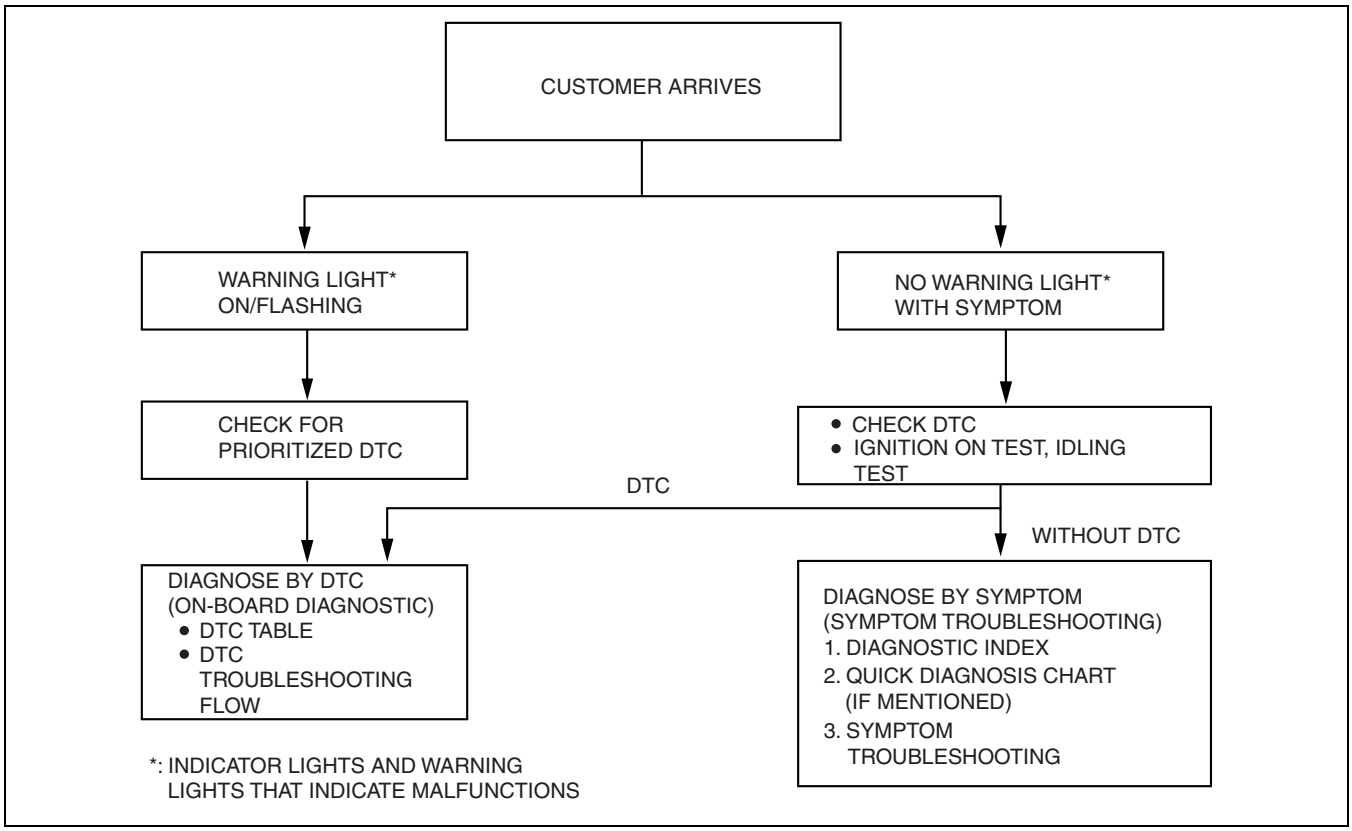
**Specification**

- The values indicate the allowable range when performing inspections or adjustments.

**Upper and lower limits**

- The values indicate the upper and lower limits that must not be exceeded when performing inspections or adjustments.

**Troubleshooting Procedure**
**Basic flow of troubleshooting**

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**DTC troubleshooting flow (on-board diagnostic)**
- Diagnostic trouble codes (DTCs) are important hints for repairing malfunctions that are difficult to simulate. Perform the specific DTC diagnostic inspection to quickly and accurately diagnose the malfunction.
- The on-board diagnostic function is used during inspection. When a DTC is shown specifying the cause of a malfunction, continue the diagnostic inspection according to the items indicated by the on-board diagnostic function.

**Diagnostic index**
- The diagnostic index lists the symptoms of specific malfunctions. Select the symptoms related or most closely relating to the malfunction.

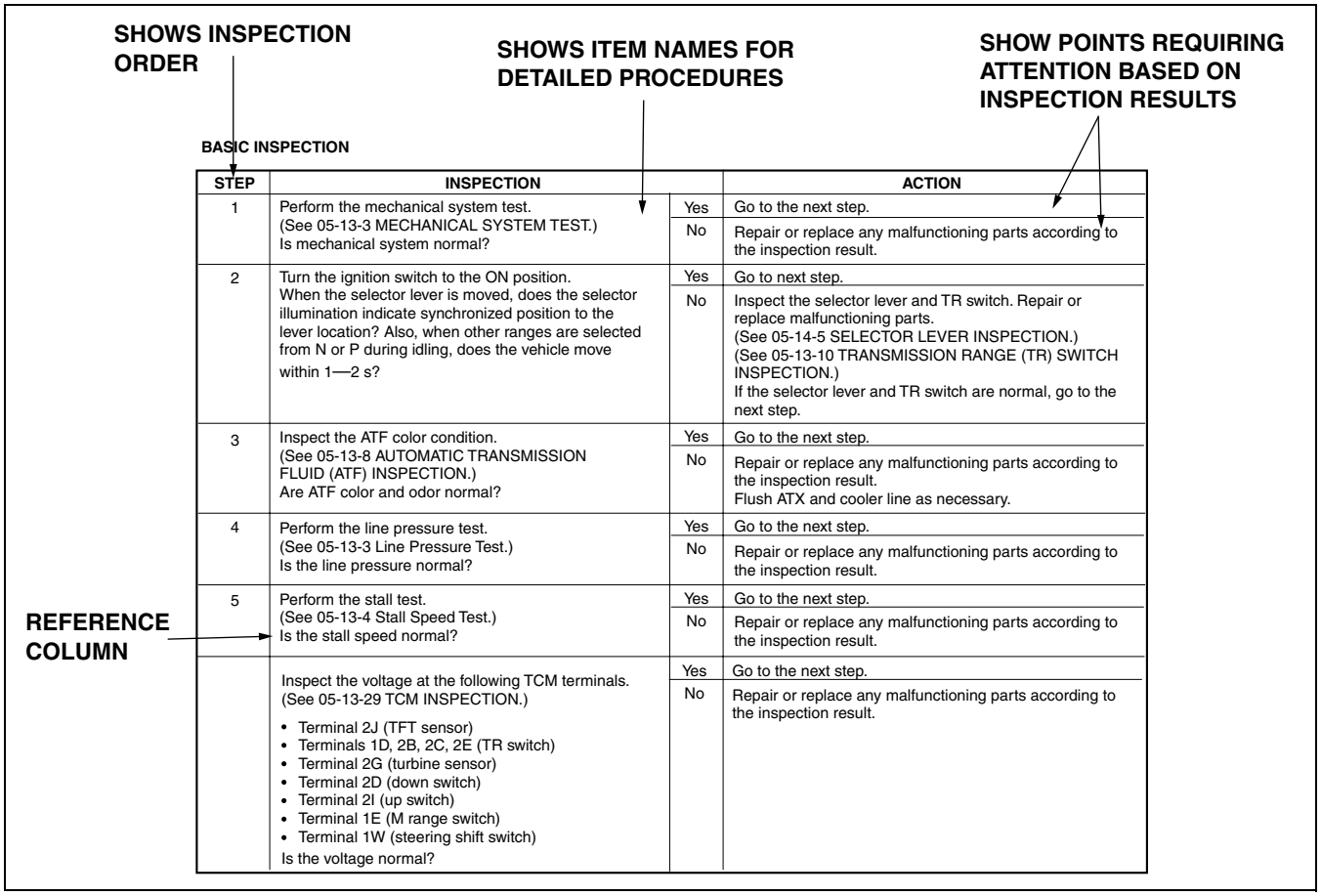
**Quick diagnosis chart (If mentioned)**
- The quick diagnosis chart lists diagnosis and inspection procedures to be performed specifically relating to the cause of the malfunction.

**Symptom troubleshooting**
- Symptom troubleshooting quickly determines the location of the malfunction according to symptom type.

**Procedures for Use**

**Using the basic inspection (section 05)**

- Perform the basic inspection procedure before symptom troubleshooting.
- Perform each step in the order shown.
- The reference column lists the location of the detailed procedure for each basic inspection.
- Although inspections and adjustments are performed according to the reference column procedures, if the cause of the malfunction is discovered during basic inspection, continue the procedures as indicated in the action column.




BASIC INSPECTION

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Perform the mechanical system test.<br>(See 05-13-3 MECHANICAL SYSTEM TEST.)<br>Is mechanical system normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| 2 | Turn the ignition switch to the ON position.<br>When the selector lever is moved, does the selector illumination indicate synchronized position to the lever location? Also, when other ranges are selected from N or P during idling, does the vehicle move within 1—2 s? | Yes | Go to next step. |
| | | No | Inspect the selector lever and TR switch. Repair or replace malfunctioning parts.<br>(See 05-14-5 SELECTOR LEVER INSPECTION.)<br>(See 05-13-10 TRANSMISSION RANGE (TR) SWITCH INSPECTION.)<br>If the selector lever and TR switch are normal, go to the next step. |
| 3 | Inspect the ATF color condition.<br>(See 05-13-8 AUTOMATIC TRANSMISSION FLUID (ATF) INSPECTION.)<br>Are ATF color and odor normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result.<br>Flush ATX and cooler line as necessary. |
| 4 | Perform the line pressure test.<br>(See 05-13-3 Line Pressure Test.)<br>Is the line pressure normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| 5 | Perform the stall test.<br>(See 05-13-4 Stall Speed Test.)<br>Is the stall speed normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| | Inspect the voltage at the following TCM terminals.<br>(See 05-13-29 TCM INSPECTION.)<br>• Terminal 2J (TFT sensor)<br>• Terminals 1D, 2B, 2C, 2E (TR switch)<br>• Terminal 2G (turbine sensor)<br>• Terminal 2D (down switch)<br>• Terminal 2I (up switch)<br>• Terminal 1E (M range switch)<br>• Terminal 1W (steering shift switch)<br>Is the voltage normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |

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## Using the DTC troubleshooting flow

- DTC troubleshooting flow shows diagnostic procedures, inspection methods, and proper action to take for each DTC.

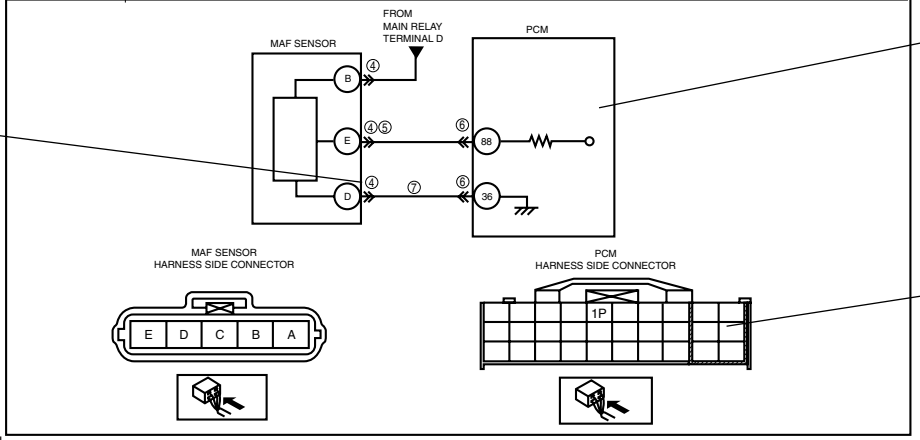
**DETECTION CONDITION describes the condition under which the DTC is detected.**

**TROUBLE CONDITION**

**DTC P0103**

| DTC PO103 | MAF circuit high input |
|---|---|
| DETECTION CONDITION | PCM monitors input voltage from TP sensor after ignition key is turned on. If input voltage at PCM terminal 68 is above 8.25 V, PCM determines that TP circuit has malfunction.<br><br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if PCM detects the above malfunction during first drive cycle. Therefore, PENDING CODE is not available.<br>• FREEZE FRAME DATE is available.<br>• DTC is stored in the PCM memory. |
| POSSIBLE CAUSE | • MAF sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit in wiring between MAF sensor terminal D and PCM terminal 36<br>• Open circuit in MAF sensor ground circuit |

**POSSIBLE CAUSE describes possible point(s) of malfunction**




**Indicates the circuit to be inspected (01 and 05 section)**

**Indicates the inspection step No. to be performed (01 and 05 section)**

**Indicates the connector related to the inspection**

**STEP shows the order of troubleshooting**

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has FREEZE FRAME DATA been recorded? | Yes | Go to next step. |
| | | No | Record FREEZE FRAME DATA on repair order, then go to next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Are related Service Bulletins and/or on-line repair information available? | Yes | Perform repair or diagnosis according to available repair information.<br>If vehicle is not repaired, then go to next step. |
| | | No | Go to next step. |
| 3 | **VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT**<br>• Connect diagnostic tool to DLC-2.<br>• Start engine.<br>• Access MAF V PID using diagnostic tool.<br>• Is MAF V PID within 0.2 - 8.3 V? | Yes | Intermittent concern is existing. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure.<br>(See 01-03-33 INTERMITTENT CONCERN TROUBLESHOOTING) |
| | | No | Go to next step. |
| 4 | **INSPECT POOR CONNECTION OF MAF SENSOR CONNECTOR**<br>• Turn ignition key to OFF.<br>• Disconnect MAF sensor connector.<br>• Check for poor connection (damaged, pulled-out terminals, corrosion etc.).<br>• Are there any malfunctions? | Yes | Repair or replace terminals, then go to Step 8. |

**ACTION describes the appropriate action to be taken according to the result (Yes/No) of the INSPECTION.**

**INSPECTION describes the method to quickly determine the malfunctioning part(s).**

**Reference item(s) to perform ACTION.**

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**Using the diagnostic index**

- Malfunction symptoms are listed in the diagnostic index under symptom troubleshooting.
- The exact malfunction symptoms can be selected by following the index.

| No. | TROUBLESHOOTING ITEM | | DESCRIPTION | Page |
|---|---|---|---|---|
| 1 | Melting of main or other fuses | | — | (See 01-03-6 MELT NO.1 MAIN OR OTHER FUSE) |
| 2 | MIL comes on | | MIL is illuminated incorrectly. | (See 01-03-7 NO.2 MIL COMES ON) |
| 3 | Will not crank | | Starter does not work. | (See 01-03-8 NO. 3 WILL NOT CRANK) |
| 4 | Hard start/long crank/erratic start/erratic crank | | Starter cranks engine at normal speed but engine requires excessive cranking time before starting. | (See 01-03-9 NO. 4 HARD START/ LONG CRANK/ERRATIC CRANK) |
| 5 | Engine stalls. | After start/at idle | Engine stops unexpectedly at idle and/or after start. | (See 01-03-11 NO. 5 ENGINE-STALLS AFTER START/AT IDLE) |
| 6 | Cranks normally but will not start | | Starter cranks engine at normal speed but engine will not run. | (See 01-03-15 NO.6 CRANKS NORMALLY BUT WILL NOT START) |
| 7 | Slow return to idle | | Engine takes more time than normal to return to idle speed. | (See 01-03-19 NO. 7 SLOW RERUN TO IDLE) |
| 8 | Engine runs rough/rotling | | Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. | (See 01-03-20 NO. 8 ENGINE RUNS ROUGH/ROLLING IDLE ) |
| 9 | Fast idle/runs on | | Engine speed continues at fast idle after warm-up.<br>Engine runs after ignition key is turned to OFF. | (See 01-03-23 NO. 9 FAST IDLE/RUNS ON) |
| 10 | Low idle/stalls during deceleration | | Engine stops unexpectedly at beginning of deceleration or recovery from deceleration. | (See 01-03-24 NO. 10 LOW IDLE/ STALLS DURING DECELERATION) |

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**Using the quick diagnosis chart**

- The chart lists the relation between the symptom and the cause of the malfunction.
- The chart is effective in quickly narrowing down the relation between symptom and cause of the malfunction. It also specifies a range of common causes when multiple malfunction symptoms occur.
- The appropriate diagnostic inspection relating to a malfunction cause as specified by the symptoms can be selected by looking down the diagnostic inspection column of the chart.

**② PARTS WHICH MAY BE THE CAUSE OF PROBLEMS**

SYMPTOM QUICK DIAGNOSTIC CHART

**PART WHICH MAY BE THE SYMPTOM**

**① CHOOSE THE ACTUALSYMPTOM**

| Troubleshooting item / Possible factor | | | Starter motor malfunction (Mechanical or electrical) | Starter circuit including ignition switch open | Improper engine oil level | Low or dead battery | Charging system malfunction | Improper engine compression | Improper valve timing | Hydrolocked engine | Improper engine oil viscosity | Improper dipstick | Base engine malfunction | Drive plate or flywheel seized | Improper tension or damaged drive belts | Improper engine coolant level | Water and anti-freeze mixture improperly | Cooling system malfunction (Radiator, hoses, overflow system, thermostat, etc.) | Cooling fan system malfunction | Engine or transaxle mounts improperly installed | Cooling fan or condenser fan seat improperly | Accelerator cable free play mis-adjustment | Fuel quality |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melts of main or other fuse | | | | | | | | | | | | | | | | | | | | | | |
| 2 | MIL comes on | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Will not crank | | x | x | | x | x | | | x | | | | x | | | | | | | | | |
| 4 | Hard to start/long crank/erratic start/erratic crank | | | | | | | | | | | | | | | | | | | | | | x |
| 5 | Engine stalls | After start/at idle | | | | | | x | x | x | | | | | | | | | | | | | x |
| 6 | Cranks normally but will not start | | | | | | | x | x | x | | | | | | | | | | | | | x |
| 7 | Slow return to idle | | | | | | | | | | | | | | | | | | x | | | | |
| 8 | Engine runs rough/rolling idle | | | | | | | x | x | | | | | | | | | | | | | | x |
| 9 | Fast idle/runs on | | | | | | | | | | | | | | | | | | | | | x | |
| 10 | Low idle/stalls during deceleration | | | | | | | | | | | | | | | | | | | | | | |
| 11 | Engine stalls/quits | Acceleration/cruise | | | | | | x | x | | | | | | | | | | | | | | x |
| | Engine runs rough | Acceleration/cruise | | | | | | x | x | | | | | | | | | | | | | | x |
| | Misses | Acceleration/cruise | | | | | | x | x | | | | | | | | | | | | | | x |
| | Buck/jerk | Acceleration/cruise/ deceleration | | | | | | x | x | | | | | | | | | | | | | | x |
| | Hesitation/stumble | Acceleration | | | | | | x | x | | | | | | | | | | | | | | x |
| | Surges | Acceleration/cruise | | | | | | x | x | | | | | | | | | | | | | | x |
| 12 | Lack/loss of power | Acceleration/cruise | | | | | | x | x | | | | | | | | | | | | | | x |
| 13 | Knocking/pinging | Acceleration/cruise | | | | | | x | | | | | | | | | | x | | | | | |
| 14 | Poor fuel economy | | | | | | | x | x | | | | | | | x | | x | x | | | | x |
| 15 | Emissions compliance | | | | | | | x | x | | | | x | | | | | x | | | | | |
| 16 | High oil consumption/leakage | | | | | | | | | | x | x | x | | | | | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | | | | x | x | x | x | x | | | | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | | | | x | x | | | | |
| 19 | Exhaust smoke | | | | | | | | | | | | x | | | | | x | | | | | |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Engine noise | | | | x | | | | | | | | x | | x | | | | | | | | |
| 22 | Vibration concerns (engine) | | | | | | | | | | | | | | x | | | | | x | x | | |
| 23 | A/C does not work sufficiently | | | | | | | | | | | | | | | | | | | | | | |
| 24 | A/C always on/ A/C compressor runs continuously | | | | | | | | | | | | | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle conditions | | | | | | | | | | | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | | | | | | | | | | | | | | | | | | | x |
| 27 | Fuel refill concerns | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Intermittent concerns | | | | | x | | | | | | | | | | | | | | | | | |
| 30 | Constant voltage | | | | | | | | | | | | | | | | | | | | | | |
| 31 | Spark plug condition | | | | | | | x | | | x | | x | | | | x | | | | | | x |
| 32 | Automatic transaxle concerns | Upshift/downshift/ engagement | (See 05-01 AUTOMATIC TRANSAXLE SYMPTOM TROUBLESOOTING) | | | | | | | | | | | | | | | | | | | | |

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**Using the symptom troubleshooting**

- Symptom troubleshooting shows diagnostic procedures, inspection methods, and proper action to be taken for each trouble symptom.

**DESCRIPTION describes what kind of TROUBLE SYMPTOM**

**TROUBLE SYMPTOM**

| 14 | Engine flares up or slips when upshifting or down shifting |
|---|---|
| DESCRIPTION | • When accelerator pedal is depressed for driveway, engine speed increase but vehicle speed increase slowly.<br>• When accelerator is depressed while driving, engine speed increases but vehicle not. |
| POSSIBLE CAUSE | • There is clutch slip because clutch is stuck or line pressure is low.<br>— Clutch stuck, slippage (forward clutch, 3-4 clutch, 2-4 brake band, one-way clutch 1, one-way clutch 2)<br>• Line pressure low<br>• Malfunction or mis-adjustment of TP sensor<br>• Malfunction of VSS<br>• Malfunction of input/turbine speed sensor<br>• Malfunction of sensor ground<br>• Malfunction of shift solenoid A, B or C<br>• Malfunction of TCC solenoid valve<br>• Malfunction of body ground<br>• Malfunction of throttle cable<br>• Malfunction of throttle valve body<br>— Poor operating of mechanical pressure<br>• Selector lever position disparity<br>• TR switch position disparity<br><br>**Note**<br>• Before following troubleshooting steps, make sure that Automatic Transaxle On-board Diagnostic and Automatic Transaxle Basic Inspection are conducted. |

**POSSIBLE CAUSE describes possible point of malfunction**

**STEP shows the order of troubleshooting.**

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is line pressure okay? | Yes | Go to next step. |
| | | No | Repair or replace any defective parts according to inspection results. |
| 2 | • Is shift point okay?<br>(See 05-17-5 ROAD TEST) | Yes | Go to next step |
| | | No | Go to symptom troubleshooting No.9 "Abnormal shift". |
| 3 | • Stop engine and turn ignition switch on.<br>• Connect diagnostic tool to DLC-2.<br>• Simulate SHIFT A, SHIFT B and SHIFT C PIDs for ON.<br>• Is operating sound of shift solenoids heard? | Yes | • Overhaul control valve body and repair or replace any defective parts.<br>(See ATX Workshop Manual GF4A-EL (1666-1A-99F))<br>• If problem remains, replace or overhaul transaxle and repair or replace defective parts.<br>(See 05-17-15 AUTOMATIC TRANSAXLE REMOVEVAL/INSTALLATION) |
| | | No | • Inspect for bend, damage, corrosion or loose connection if shift solenoid A, B, or C terminal on ATX.<br>• Inspect for shift solenoid mechanical stuck.<br>(See 05-17-14 Inspection of Operation)<br>• If shift solenoids are okay, inspect for open or short circuit between PCM connector terminal A, B or C. |
| 4 | • Verify test results.<br>— If okay, return to diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>— If vehicle is repaired, troubleshooting completed.<br>— If vehicle is not repaired or additional diagnostic information is not available, replace or reprogram PCM. | | |

**Reference item(s) for additional information to perform INSPECTION.**

**INSPECTION describes the method to quickly determine the malfunctioning part(s).**

**ACTION describes the appropriate action to be taken according to the result (Yes/No) of the INSPECTION.**

**How to perform ACTION is described in the relative material shown.**

**Reference item(s) to perform ACTION.**

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## UNITS

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| | |
|---|---|
| Electrical current | A (ampere) |
| Electric power | W (watt) |
| Electric resistance | ohm |
| Electric voltage | V (volt) |
| Length | mm (millimeter) |
| | in (inch) |
| Negative pressure | kPa (kilo pascal) |
| | mmHg (millimeters of mercury) |
| | inHg (inches of mercury) |
| Positive pressure | kPa (kilo pascal) |
| | $kgf/cm^2$ (kilogram force per square centimeter) |
| | psi (pounds per square inch) |
| Torque | N·m (Newton meter) |
| | kgf·m (kilogram force meter) |
| | kgf·cm (kilogram force centimeter) |
| | ft·lbf (foot pound force) |
| | in·lbf (inch pound force) |
| Volume | L (liter) |
| | US qt (U.S. quart) |
| | Imp qt (Imperial quart) |
| | ml (milliliter) |
| | cc (cubic centimeter) |
| | cu in (cubic inch) |
| | fl oz (fluid ounce) |
| Weight | g (gram) |
| | oz (ounce) |

**Conversion to SI Units (Système International d'Unités)**

- All numerical values in this manual are based on SI units. Numbers shown in conventional units are converted from these values.

**Rounding Off**

- Converted values are rounded off to the same number of places as the SI unit value. For example, if the SI unit value is 17.2 and the value after conversion is 37.84, the converted value will be rounded off to 37.8.

**Upper and Lower Limits**

- When the data indicates upper and lower limits, the converted values are rounded down if the SI unit value is an upper limit, and rounded up if the SI unit value is a lower limit. Therefore, converted values for the same SI unit value may differ after conversion. For example, consider 2.7 $kgf/cm^2$ in the following specifications:

  **210— 260 kPa {2.1— 2.7 $kgf/cm^2$, 30— 38 psi}**
  **270— 310 kPa {2.7— 3.2 $kgf/cm^2$, 39— 45 psi}**

- The actual converted values for 2.7 $kgf/cm^2$ are 265 kPa and 38.4 psi. In the first specification, 2.7 is used as an upper limit, so the converted values are rounded down to 260 and 38. In the second specification, 2.7 is used as a lower limit, so the converted values are rounded up to 270 and 39.

## SERVICE CAUTIONS

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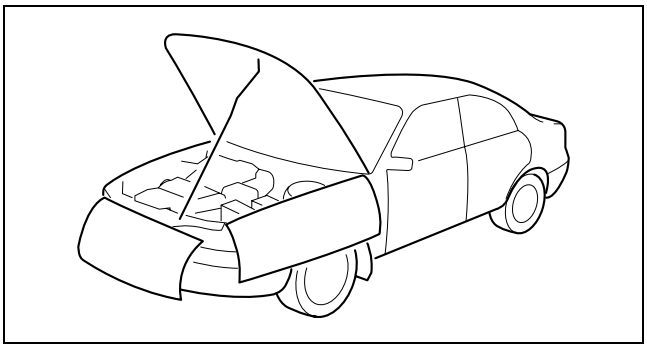
**Injury/damage Prevention Precautions**

- Depending on the vehicle, the cooling fan may operate suddenly even when the ignition switch is turned off. Therefore, keep hands and tools away from the cooling fan even if the cooling fan is not operating to prevent injury to personnel or damage to the cooling fan. Always disconnect the negative battery cable when servicing the cooling fan or parts near the cooling fan.



**Protection of the Vehicle**

- Always be sure to cover fenders, seats and floor areas before starting work.



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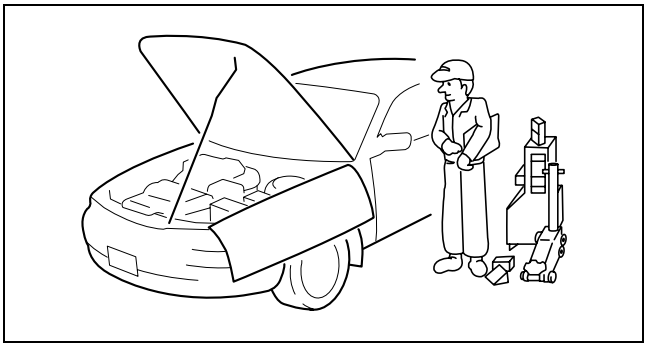
**Preparation of Tools and Measuring Equipment**

- Be sure that all necessary tools and measuring equipment are available before starting any work.



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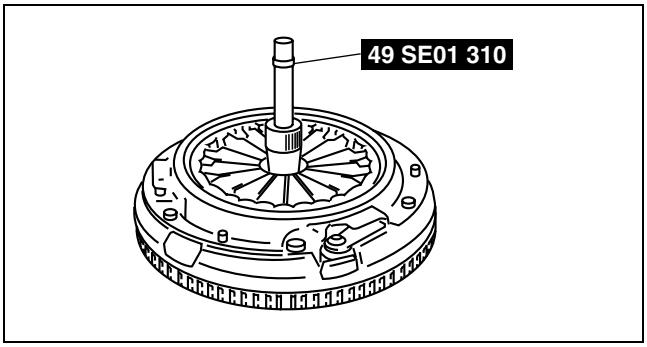
**Special Service Tools**

- Use special service tools or the equivalent when they are required.

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**Malfunction Diagnosis System**

- Use the Mazda modular diagnostic system (M-MDS) for malfunction diagnosis.

**Disconnection of the Negative Battery Cable**

- When working with the negative battery cable disconnected, wait for 1 min or more to allow the back up power supply of the SAS control module to deplete its stored power after the cable is disconnected.
- Disconnecting the battery cable will delete the memories of the clock, audio, and DTCs, etc. Therefore, it is necessary to note down the information stored in those memories before disconnecting the cable.
- If the battery had been disconnected during vehicle maintenance or for other reasons, the window will not fully close automatically. Initialize the power window system for the power window main switch and the sub switch (FR).
  (See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE)

**Warning**

- **When the negative battery cable is disconnected, the initialization setting of the steering angle sensor is cleared. Therefore, perform the initialization procedure after connecting the negative battery cable. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)**

**Oil Leakage Inspection**

- Use either of the following procedures to identify the type of oil that is leaking:

**Using UV light (black light)**

1. Remove any oil on the engine or transaxle/transmission.

**Note**

- Referring to the fluorescent dye instruction manual, mix the specified amount of dye into the engine oil or ATF (or transaxle/transmission oil).

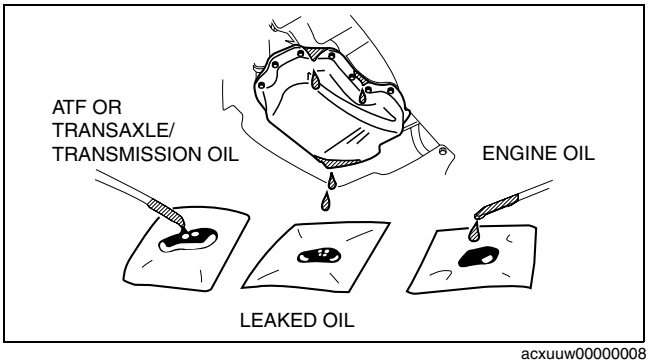
2. Pour the fluorescent dye into the engine oil or ATF (or transaxle/transmission oil).
3. Allow the engine to run for 30 min.
4. Inspect for dye leakage by irradiating with UV light (black light), and identify the type of oil that is leaking.
5. If no dye leakage is found, allow the engine to run for another 30 min. or drive the vehicle then reinspect.
6. Find where the oil is leaking from, then make necessary repairs.

**Note**

- To determine whether it is necessary to replace the oil after adding the fluorescent dye, refer to the fluorescent dye instruction manual.

**Not using UV light (black light)**

1. Gather some of the leaking oil using an absorbent white tissue.
2. Take samples of engine oil and ATF (or transaxle/transmission oil), both from the dipstick, and place them next to the leaked oil already on the tissue.
3. Compare the appearance and smell, and identify the type of oil that is leaking.
4. Remove any oil on the engine or transaxle/transmission.
5. Allow the engine to run for 30 min.
6. Check the area where the oil is leaking, then make necessary repairs.

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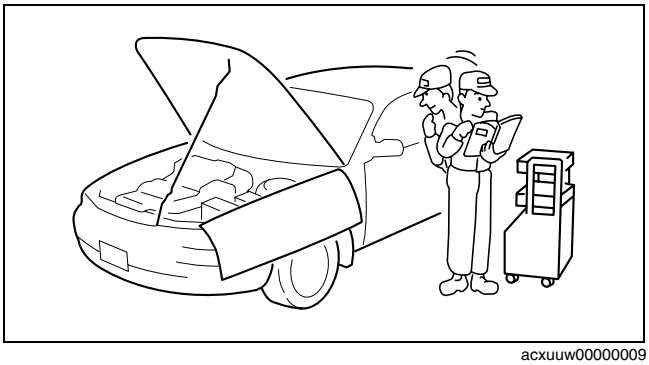
**Removal of Parts**

- While correcting a problem, also try to determine its cause. Begin work only after first learning which parts and sub-components must be removed and disassembled for replacement or repair. After removing the part, plug all holes and ports to prevent foreign material from entering.



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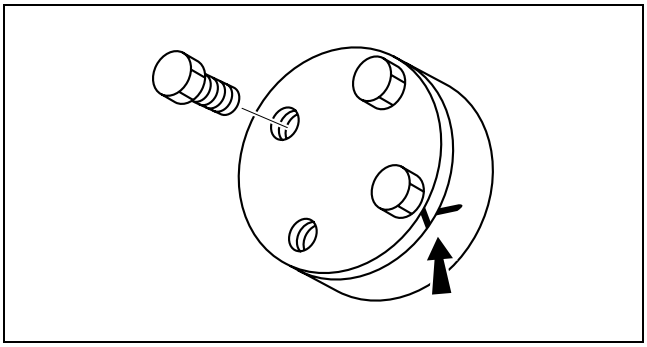
**Disassembly**

- If the disassembly procedure is complex, requiring many parts to be disassembled, all parts should be marked in a place that will not affect their performance or external appearance, and identified so that reassembly can be performed easily and efficiently.



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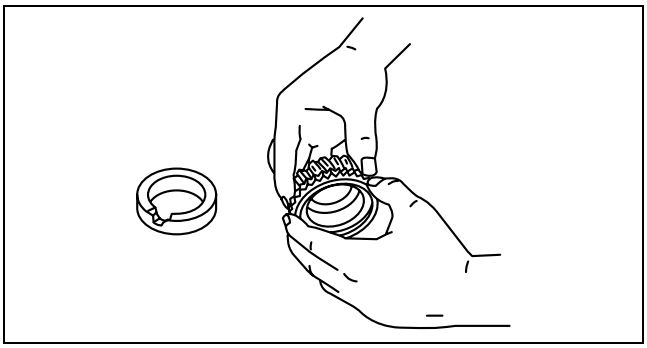
**Inspection During Removal, Disassembly**

- When removed, each part should be carefully inspected for malfunction, deformation, damage and other problems.



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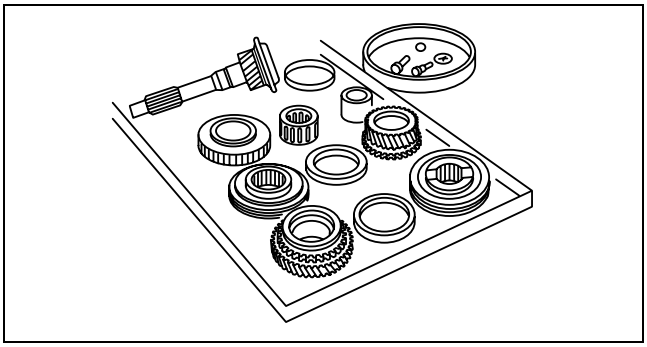
**Arrangement of Parts**

- All disassembled parts should be carefully arranged for reassembly.
- Be sure to separate or otherwise identify the parts to be replaced from those that will be reused.



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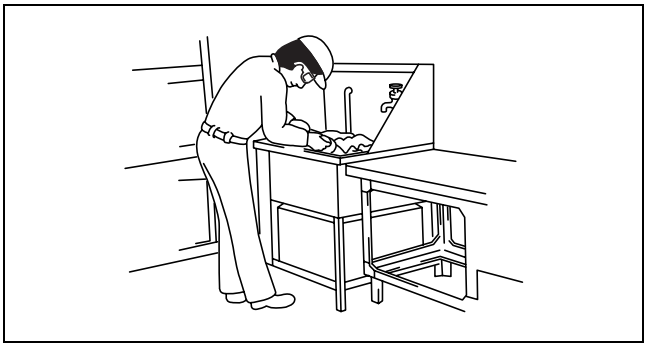
**Cleaning of Parts**

- All parts to be reused should be carefully and thoroughly cleaned in the appropriate method.

**Warning**

- **Using compressed air can cause dirt and other particles to fly out causing injury to the eyes. Wear protective eye wear whenever using compressed air.**



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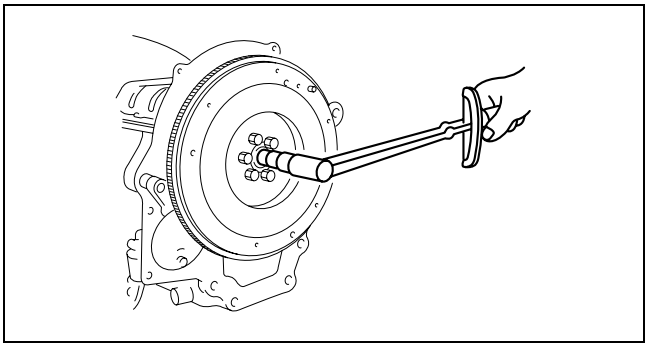
**Reassembly**

- Standard values, such as torques and certain adjustments, must be strictly observed in the reassembly of all parts.
- If removed, these parts should be replaced with new ones:
  — Oil seals
  — Gaskets
  — O-rings
  — Lock washers
  — Cotter pins
  — Nylon nuts



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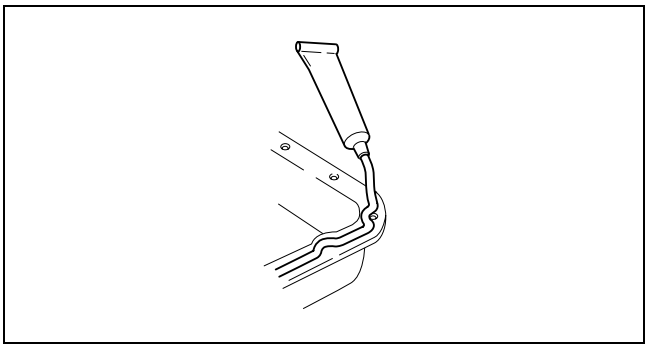
- Depending on location:
  — Sealant and gaskets, or both, should be applied to specified locations. When sealant is applied, parts should be installed before sealant hardens to prevent leakage.
  — Oil should be applied to the moving components of parts.
  — Specified oil or grease should be applied at the prescribed locations (such as oil seals) before reassembly.



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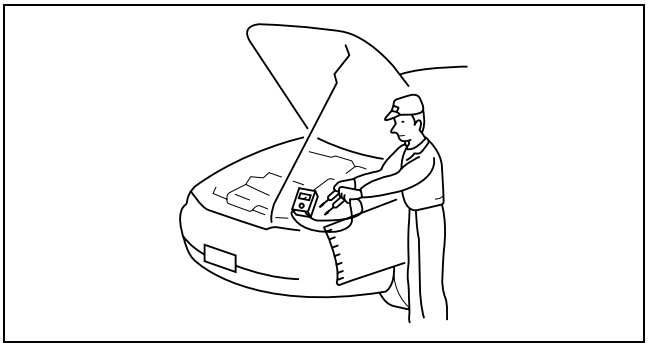
**Adjustment**

- Use suitable gauges and testers when making adjustments.



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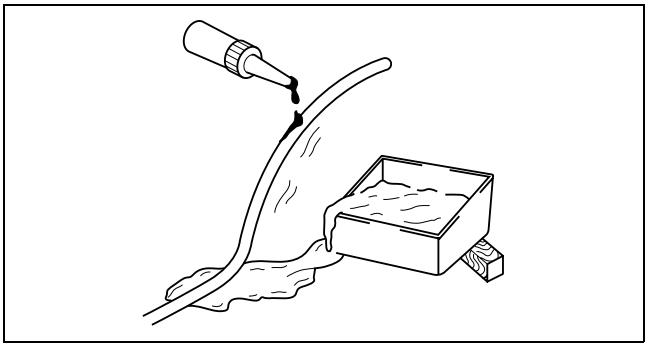
**Rubber Parts and Tubing**

- Prevent gasoline or oil from getting on rubber parts or tubing.



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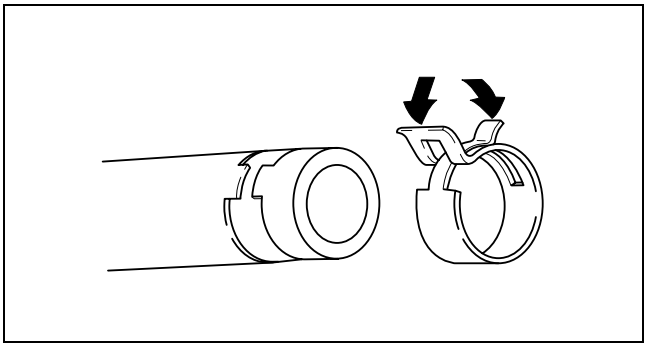
**Hose Clamps**

- When reinstalling, position the hose clamp in the original location on the hose and squeeze the clamp lightly with large pliers to ensure a good fit.



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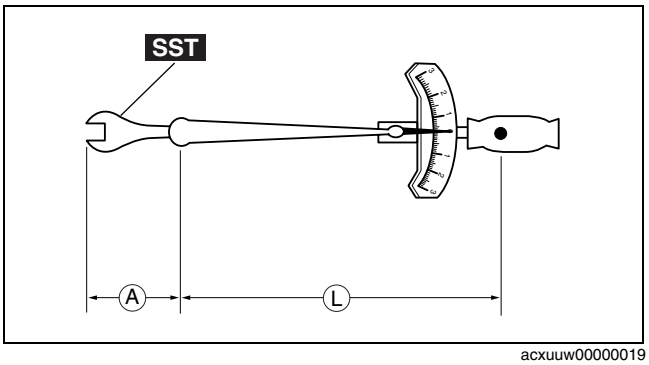
**Torque Formulas**

- When using a torque wrench-**SST** or equivalent combination, the specified torque must be recalculated due to the extra length that the **SST** or equivalent adds to the torque wrench. Recalculate the torque by using the following formulas. Choose the formula that applies to you.

| Torque Unit | Formula |
|---|---|
| N·m | N·m × [L/(L+A)] |
| kgf·m | kgf·m × [L/(L+A)] |
| kgf·cm | kgf·cm × [L/(L+A)] |
| ft·lbf | ft·lbf × [L/(L+A)] |
| in·lbf | in·lbf × [L/(L+A)] |

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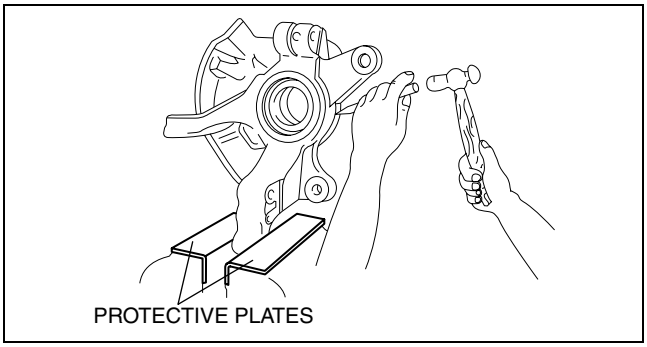
A : The length of the **SST** past the torque wrench drive.
L : The length of the torque wrench.

**Vise**

- When using a vise, put protective plates in the jaws of the vise to prevent damage to parts.

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**Dynamometer**

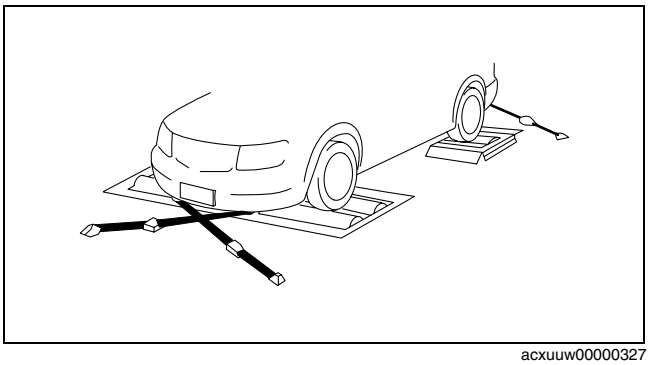
- When inspecting and servicing the power train on the dynamometer or speedometer tester, pay attention to the following:
  - — Place a fan, preferably a vehicle-speed proportional type, in front of the vehicle.
  - — Make sure the vehicle is in a facility with an exhaust gas ventilation system.
  - — Since the rear bumper might deform from the heat, cool the rear with a fan. (Surface of the bumper must be below**70°C {158°F}** degrees.)
  - — Keep the area around the vehicle uncluttered so that heat does not build up.
  - — Watch the water temperature gauge and do not overheat the engine.
  - — Avoid added load to the engine and maintain normal driving conditions as much as possible.

**Note**
- When only the front or rear wheels are rotated on a chassis dynamometer or equivalent, the DSC CM determines that there is a malfunction in the DSC and illuminates the following lights:
  — ABS warning light
  — Brake system warning light
  — DSC indicator light
- If the above lights are illuminated, dismount the vehicle from the chassis dynamometer and turn the ignition switch to the LOCK position. Then, turn the ignition switch back to the ON position, run the vehicle at 10 km/h or more and verify that the warning lights go out. In this case, a DTC will be stored in the memory. Clear the DTC from the memory by following the memory clearing procedure [DSC] in the on-board diagnostic system. (See04-02-3 ON-BOARD DIAGNOSIS.)

**AWD inspection/service**
**Speedometer tester measurement**

**Caution**
- **Install the tension bar (chain wire) to the tie down hook and secure the vehicle to prevent it from rolling and running off.**
- **Do not accelerate suddenly from a standstill or accelerate/decelerate rapidly.**

**Free roller type**
1. Align the free rollers with the wheel base and tread, then set them on the floor properly.
2. Drive the vehicle slowly onto the tester roller and free rollers.
3. Start the engine and accelerate gradually to inspect the speedometer.
4. After inspection, decelerate gradually with gentle braking.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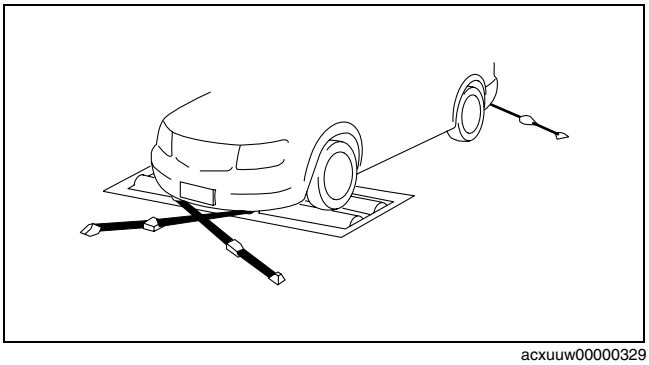
**Propeller shaft removal type**
1. Remove the propeller shaft. (See03-15-3 PROPELLER SHAFT REMOVAL/ INSTALLATION.)
2. Place the front wheels on the tester roller.
3. Accelerate gradually and inspect the speedometer.
4. After inspection, decelerate gradually with gentle braking.
5. Install the propeller shaft. (See03-15-3 PROPELLER SHAFT REMOVAL/ INSTALLATION.)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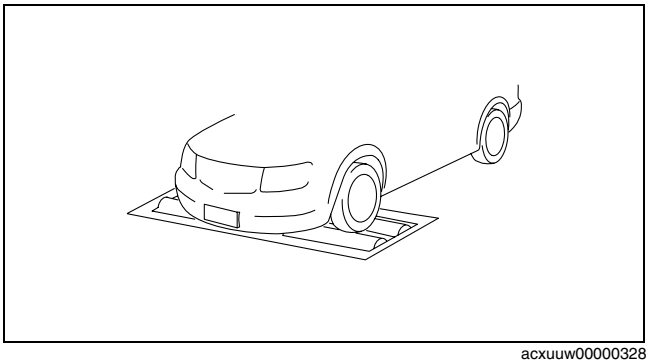
**Brake tester measurement**
1. Place the wheels (front or rear) to be measured on the tester roller.
2. Shift to the N position/neutral.
3. Activate the tester roller and measure braking force. If there is a large amount of brake drag force, the electronic control system coupling may be affected. Jack up all four wheels to eliminate the effect of the coupling and rotate each wheel by hand to verify the rotation condition.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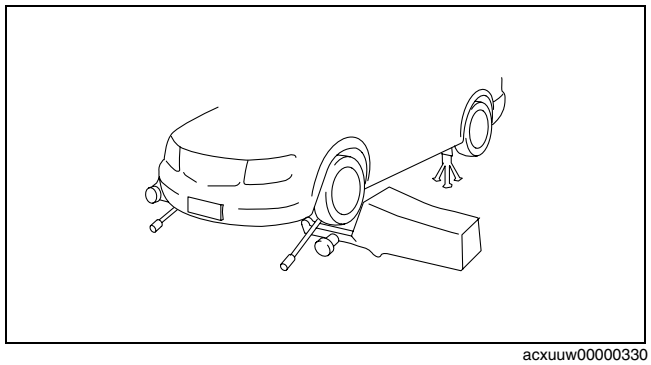
**Wheel balancer (on the vehicle balancer)**

1. Jack up all four wheels.
2. Support the wheels (front or rear) on the side to be measured (near the wheels) using a wheel balancer sensor stand.
3. Support the wheels on the side not to be measured (near the wheels) using safety stands.
4. Set up the wheel balancer and rotate the wheels using engine drive to measure the wheel balance.



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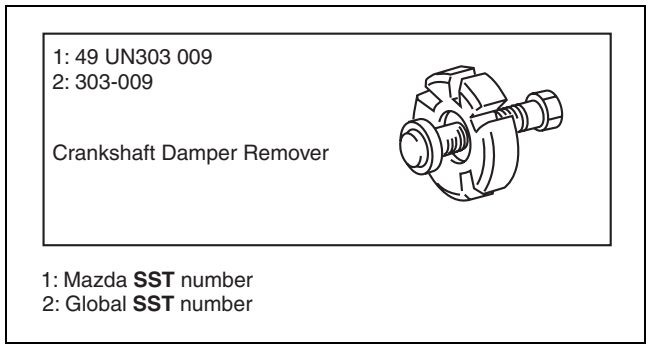
**SST**

- Some global **SST** or equivalent are used as **SSTs** necessary for vehicle repair. Note that these **SSTs** are marked with global **SST** numbers.
- Note that a global **SST** number is written together with a corresponding Mazda **SST** number as shown below.

**Example (section **-60)**

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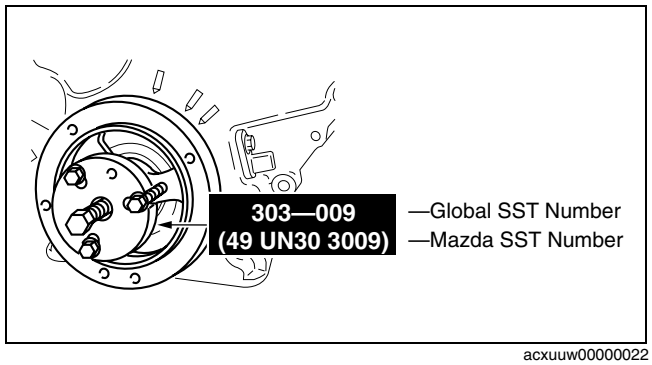
**Example (Except section **-60)**

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## INSTALLATION OF RADIO SYSTEM

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- If a radio system is installed improperly or if a high-powered type system is used, the CIS and other systems may be affected. When the vehicle is to be equipped with a radio, observe the following precautions:
  — Install the antenna at the farthest point from control modules.
  — Install the antenna feeder as far as possible from the control module wiring harnesses.
  — Ensure that the antenna and feeder are properly adjusted.
  — Do not install a high-powered radio system.

## ELECTRICAL SYSTEM

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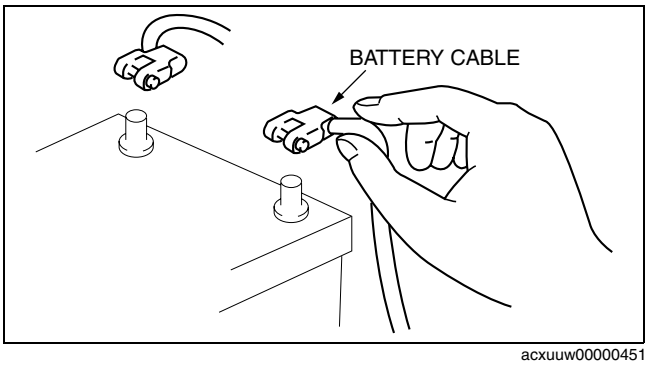
### Electrical Parts

### Battery cable

- Before disconnecting connectors or removing electrical parts, disconnect the negative battery cable.

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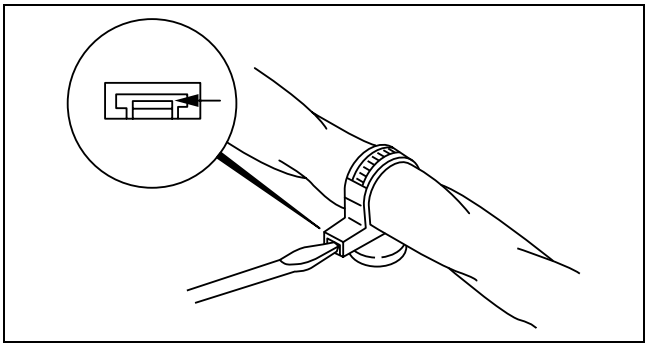
### Wiring Harness

- To remove the wiring harness from the clip in the engine room, pry up the hook of the clip using a flathead screwdriver.



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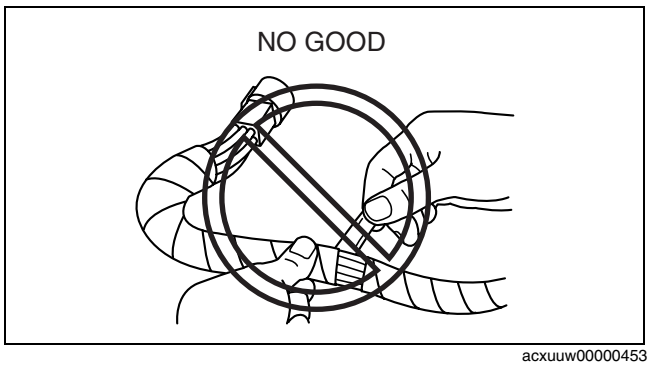
**Caution**

- **Do not remove the wiring harness protective tape. Otherwise, the wires could rub against the body, which could result in water penetration and electrical shorting.**

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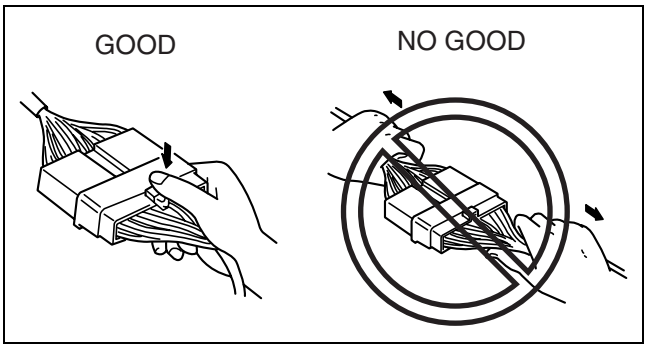
**Connectors**

**Disconnecting connectors**

- When disconnecting a connector, grasp the connectors, not the wires.

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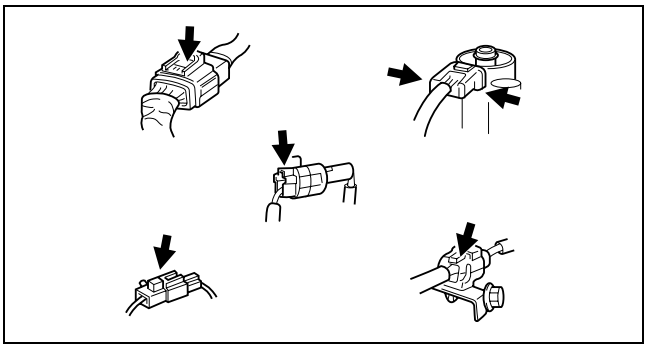
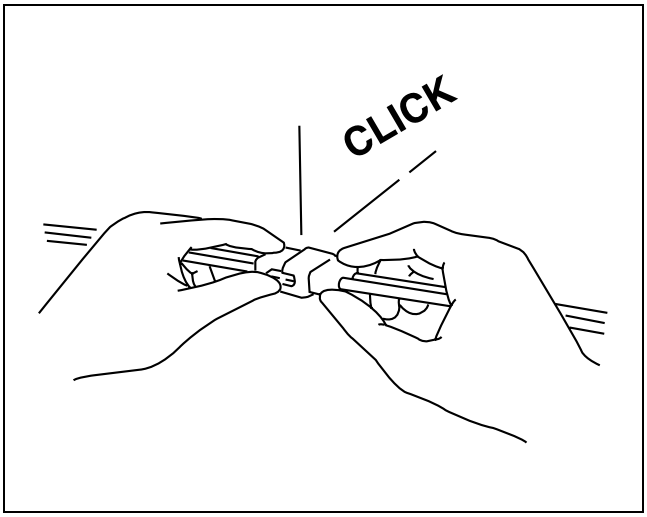
- Connectors can be disconnected by pressing or pulling the lock lever as shown.



acxuuw00000455

**Locking connector**

- When locking connectors, listen for a click indicating they are securely locked.

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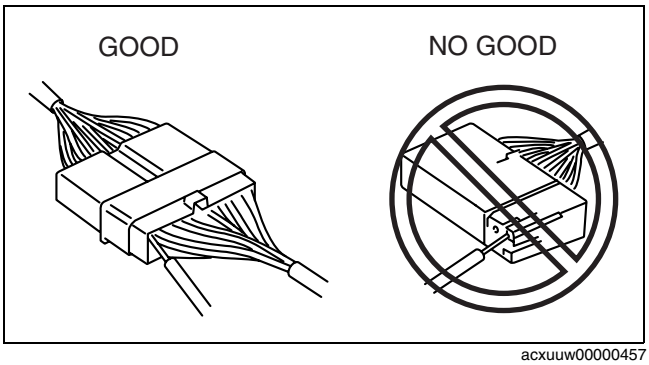
**Inspection**

**Caution**
- **To prevent damage to the terminal, wrap a thin wire around the tester probe before inserting into terminal.**

- When a tester is used to inspect for continuity or measuring voltage, insert the tester probe from the wiring harness side.



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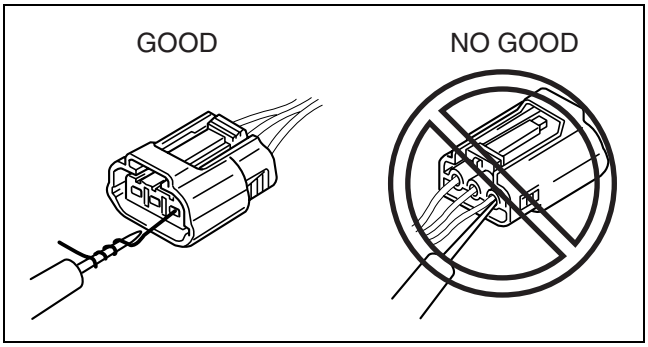
- Inspect the terminals of waterproof connectors from the connector side since they cannot be accessed from the wiring harness side.



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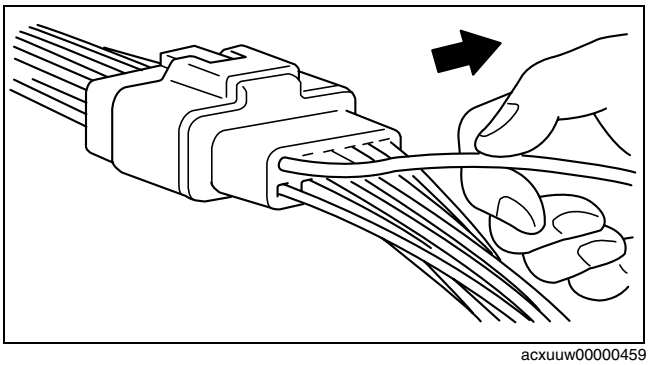
**Terminals**
**Inspection**
- Pull lightly on individual wires to verify that they are secured in the terminal.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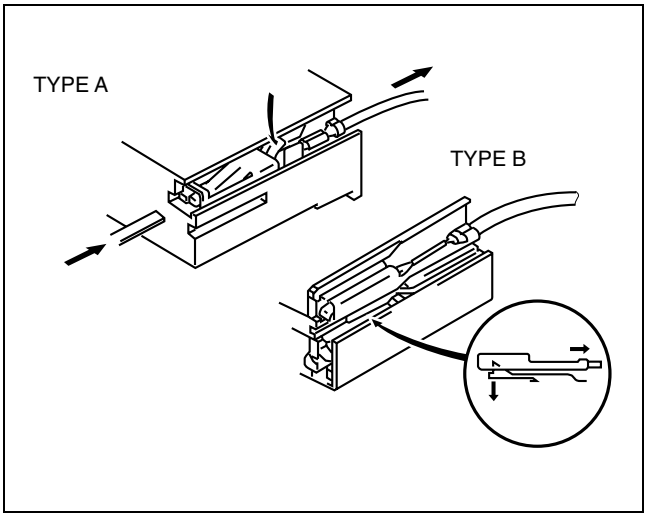
**Replacement**

- Use the appropriate tools to remove a terminal as shown. When installing a terminal, be sure to insert it until it locks securely.
- Insert a thin piece of metal from the terminal side of the connector and with the terminal locking tab pressed down, pull the terminal out from the connector.

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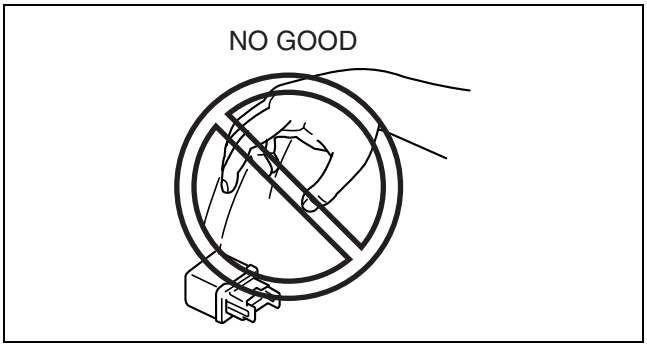
**Sensors, Switches, and Relays**

- Handle sensors, switches, and relays carefully. Do not drop them or strike them against other objects.

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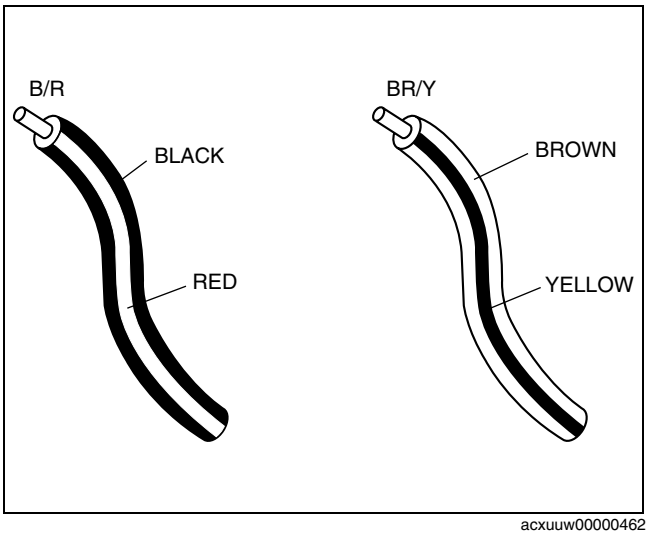
**Wiring Harness**

**Wiring color codes**

- Two-color wires are indicated by a two-color code symbol.
- The first letter indicates the base color of the wire and the second is the color of the stripe.

| CODE | COLOR | CODE | COLOR |
|---|---|---|---|
| B | Black | O | Orange |
| BR | Brown | P | Pink |
| G | Green | R | Red |
| GY | Gray | V | Violet |
| L | Blue | W | White |
| LB | Light Blue | Y | Yellow |
| LG | Light Green | – | – |

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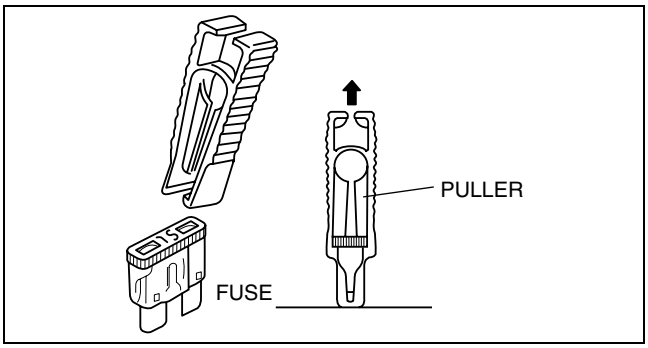
**Fuse**

**Replacement**

- When replacing a fuse, be sure to replace it with one of the same capacity. If a fuse malfunctions again, the circuit probably has a short and the wiring should be inspected.
- Be sure the negative battery terminal is disconnected before replacing a main fuse.
- When replacing a pullout fuse, use the fuse puller.

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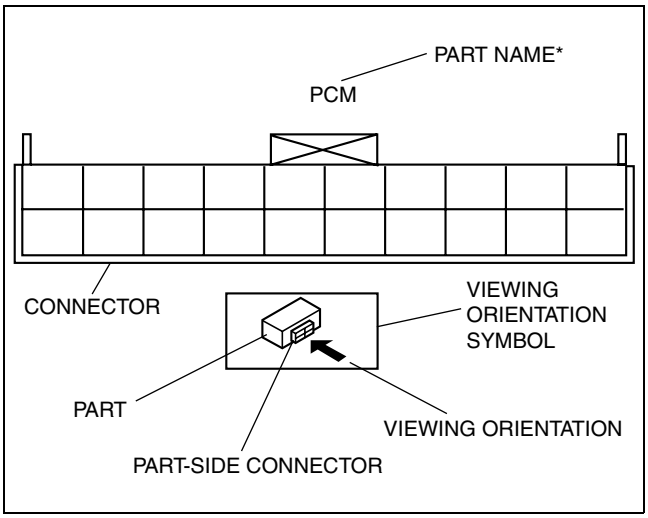
**Viewing orientation for Connectors**

- The viewing orientation for connectors is indicated with a symbol.
- The figures showing the viewing orientation are the same as those used in Wiring Diagrams.
- The viewing orientations are shown in the following three ways.

**Part-side connector**

The viewing orientation for part-side connectors is from the terminal side.

* : Part names are shown only when there are multiple connector drawings.

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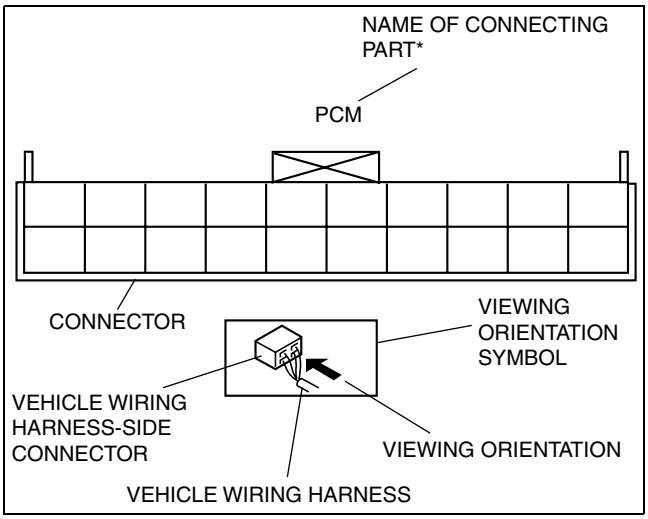
**Vehicle harness-side connector**

The viewing orientation for vehicle wiring harness-side connectors is from the wiring harness side.

* : Part names are shown only when there are multiple connector drawings.

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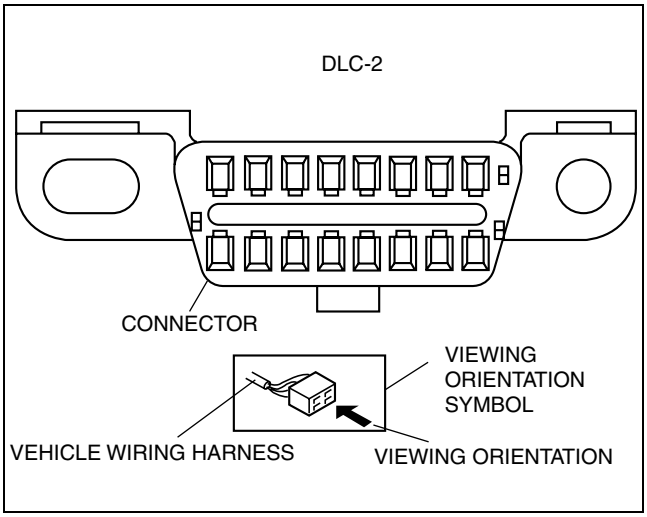
**Other**

When it is necessary to show the terminal side of the vehicle wiring harness-side connectors, such as the following connectors, the viewing orientation is from the terminal side.

- Main fuse block and the main fuse block relays
- Data link connector
- Check connector
- Relay box

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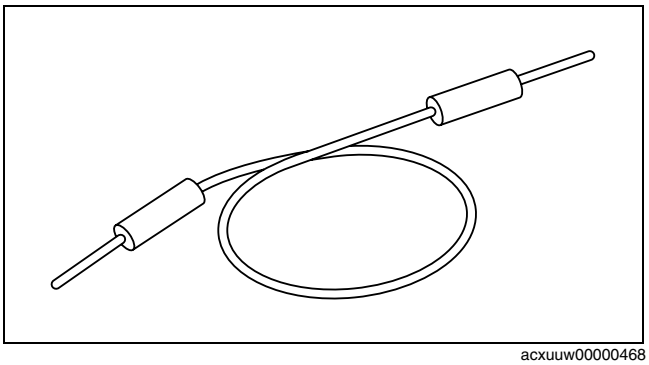
**Electrical Troubleshooting Tools**

**Jumper wire**

**Caution**

- **Do not connect a jumper wire from the power source line to a body ground. This may cause burning or other damage to wiring harnesses or electronic components.**

- A jumper wire is used to create a temporary circuit. Connect the jumper wire between the terminals of a circuit to bypass a switch.



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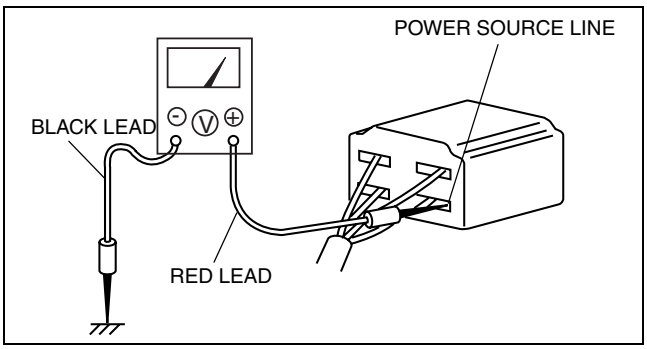
**Voltmeter**

- The DC voltmeter is used to measure circuit voltage. A voltmeter with a range of **15 V or more is used by connecting the positive (+) probe (red lead wire) to the point where voltage will be measured and the negative (-) probe (black lead wire) to a body ground.**

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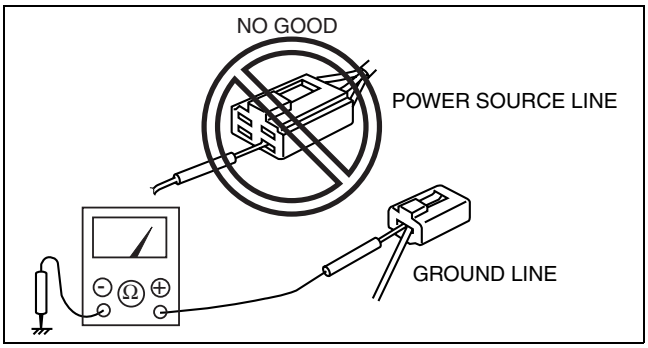
**Ohmmeter**

**Caution**
- **Do not connect the ohmmeter to any circuit where voltage is applied. This will damage the ohmmeter.**

- The ohmmeter is used to measure the resistance between two points in a circuit and to inspect for continuity and short circuits.



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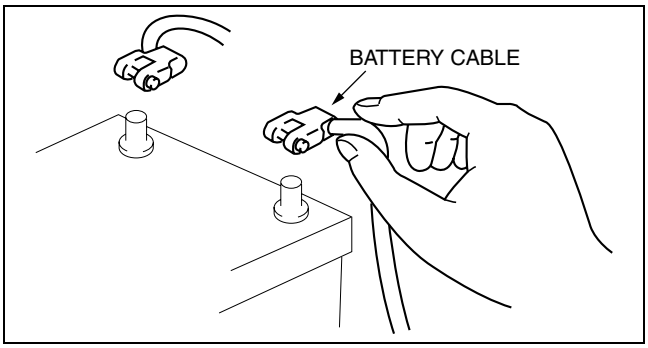
**Precautions Before Welding**

A vehicle has various electrical parts. To protect the parts from excessive current generated when welding, be sure to perform the following procedure.

1. Turn the ignition switch to the LOCK position.
2. Disconnect the battery cables.



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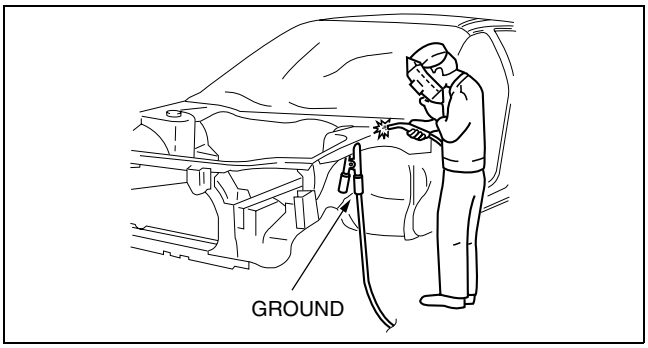
3. Securely connect the welding machine ground near the welding area.
4. Cover the peripheral parts of the welding area to protect them from weld spatter.



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## JACKING POSITIONS, VEHICLE LIFT (2 SUPPORTS) AND SAFETY STAND (RIGID RACK) POSITIONS

id000000800500

### Jacking Positions

**Warning**

- **Improperly jacking a vehicle is dangerous. The vehicle can slip off the jack and cause serious injury. Use only the correct front and rear jacking points and block the wheels.**

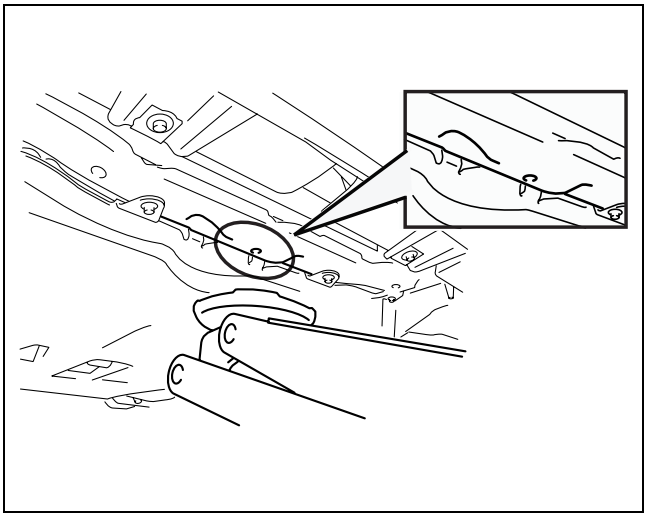
- Use safety stands to support the vehicle after it has been lifted.

### Front

**Note**

- To prevent obstruction between the jack body and front bumper when the jack body is inserted, use a low-floor type jack (frame height is 170 mm or less).

- Near the center or the front crossmember.



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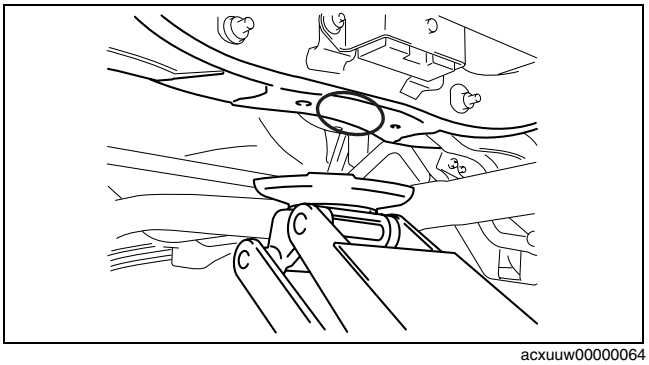
### Rear

**2WD**

- Near the center of the rear crossmember.



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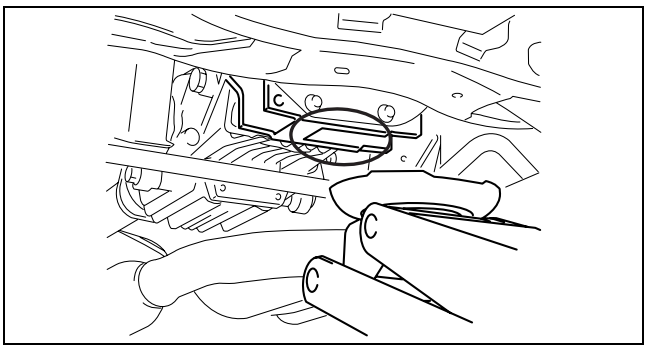
**AWD**

- At the center of the rear differential.



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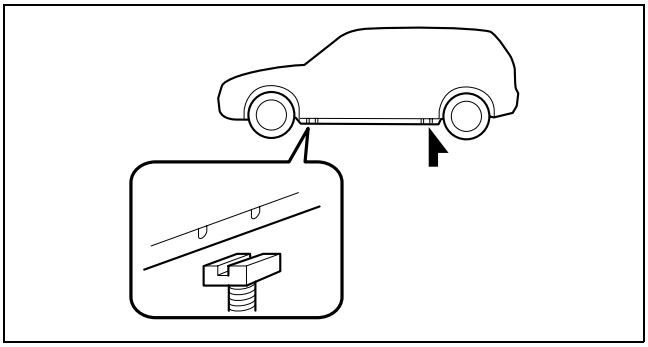
**Vehicle Lift Positions**
**Front and rear**

**Warning**
- **Lifting a vehicle that is not stabilized is dangerous. The vehicle can slip off the lift and cause serious injury and/or vehicle damage. Make sure that the vehicle is on the lift horizontally by adjusting the height of the support at the end of the arm of the lift.**

**Note**
- The arrow at the rear of the vehicle indicates that it is the same as the illustration for the front of the vehicle.

- Both sides of the vehicle, on side sills.



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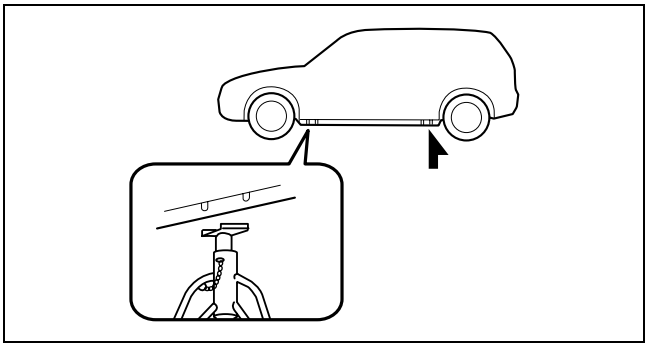
**Safety Stand Positions**
**Front and rear**

**Note**
- The arrow at the rear of the vehicle indicates that it is the same as the illustration for the front of the vehicle.

- Both sides of the vehicle, on side sills.



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## TOWING

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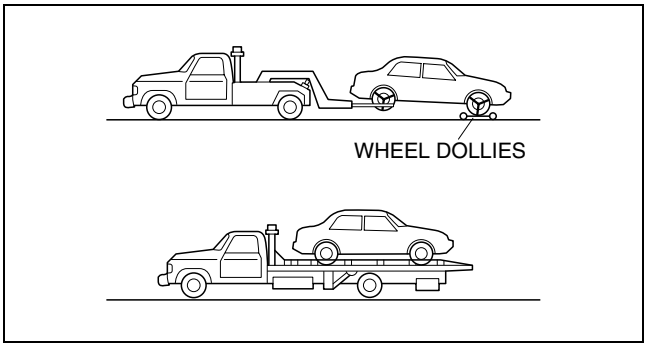
- Proper lifting and towing are necessary to prevent damage to the vehicle.
  Particularly when towing a AWD vehicle, where all the wheels are connected to the drive train, proper transporting of the vehicle is absolutely essential to avoid damaging the drive system. Government and local laws must be followed.
- A towed 2WD vehicle should have its front wheels off the ground. If excessive damage or other conditions prevent this, use wheel dollies.
- When towing a 2WD vehicle with the rear wheels on the ground, release the parking brake.
- A towed AWD vehicle must have all its wheels off the ground.

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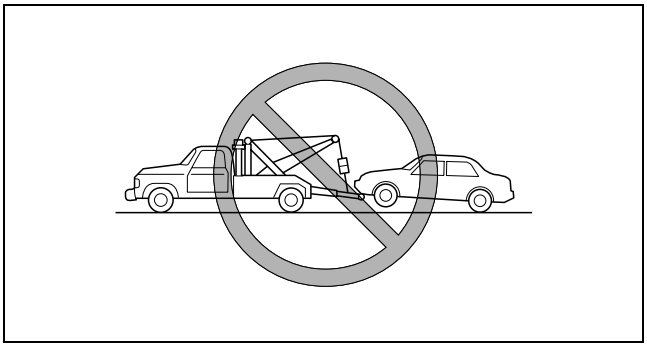
### Towing a 2WD Vehicle

**Caution**

- **Don't tow with sling-type equipment. This could damage the vehicle. Use wheel-lift or flatbed equipment.**



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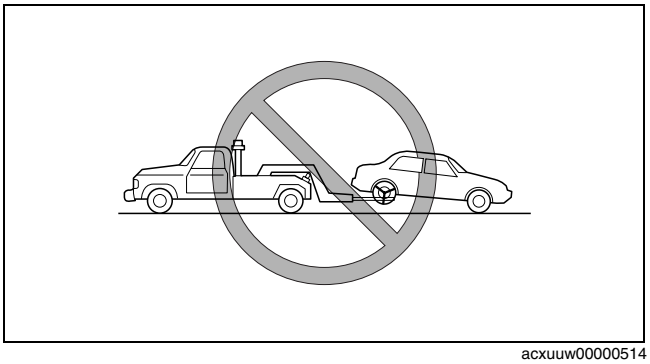
**Caution**

- **Don't tow the vehicle pointed backward with driving wheels on the ground. This may cause internal damage to the transaxle.**



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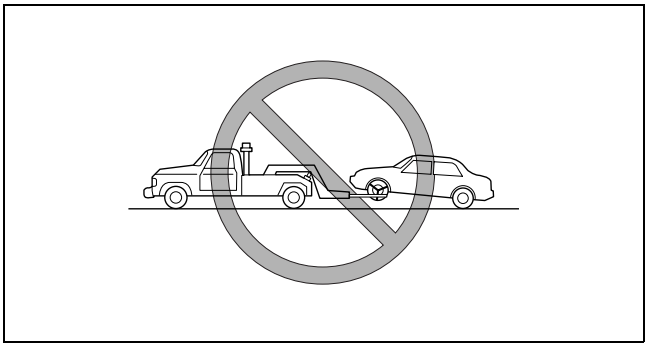
**Towing a AWD Vehicle**

**Warning**

- **Towing a AWD vehicle with either the front or rear wheels on the ground is dangerous as the drive train could be damaged, or the vehicle could trail away from the tow truck and cause an accident. Always tow a AWD vehicle with all four wheels off the ground. If the drive train has been damaged, transport the vehicle on a flat bed truck.**



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**Towing/Tiedown Hooks**

**Caution**

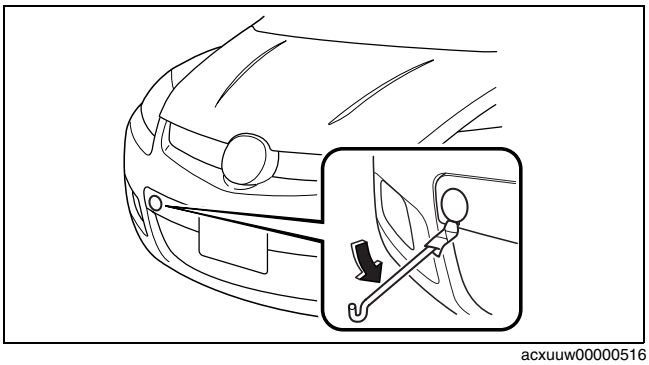
- **Don't use the tiedown hooks under the front and rear for towing. They are designed ONLY for tying down the vehicle when it's being transported. Using them for towing will damage the bumper.**

**Tiedown Hooks**

1. Remove the tiedown eyelet, lug wrench, and jack lever from the trunk.
2. Wrap a screwdriver or similar tool with a soft cloth to prevent damage to the bumper and open the cap located on the front and rear bumper.

**Caution**

- **The cap cannot be completely removed. Do not use excessive force as it may damage the cap or scratch the painted bumper surface.**



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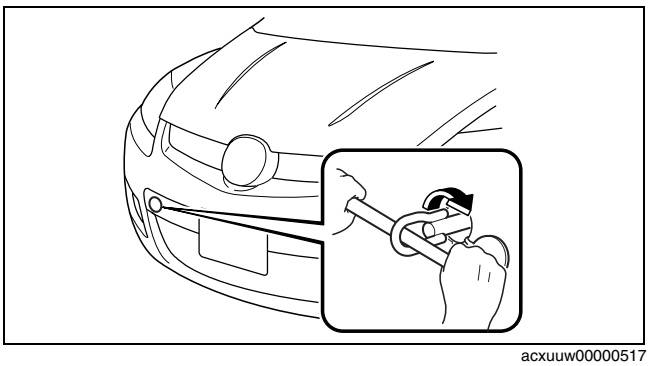
3. Securely install the tiedown eyelet using the wheel brace.



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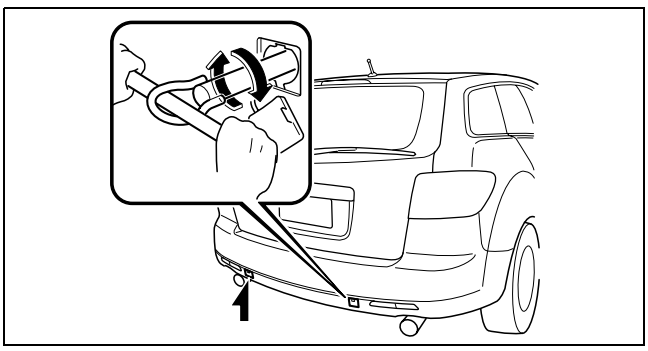


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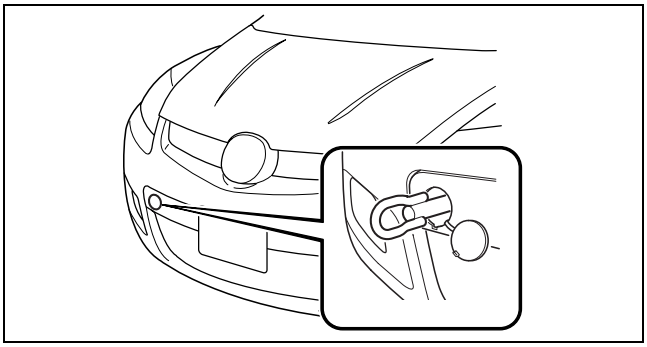
4. Hook the tying rope to the tiedown eyelet.



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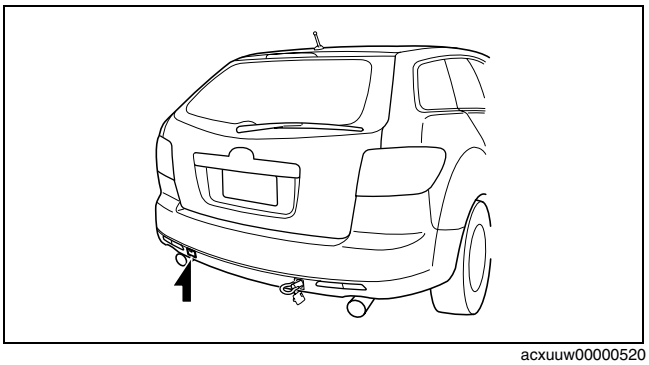


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**Caution**

- **If the tiedown eyelet is not securely tightened, it may loosen or disengage from the bumper when tying down the vehicle. Make sure that the tiedown eyelet is securely tightened to the bumper.**

**TIEDOWN HOOK**

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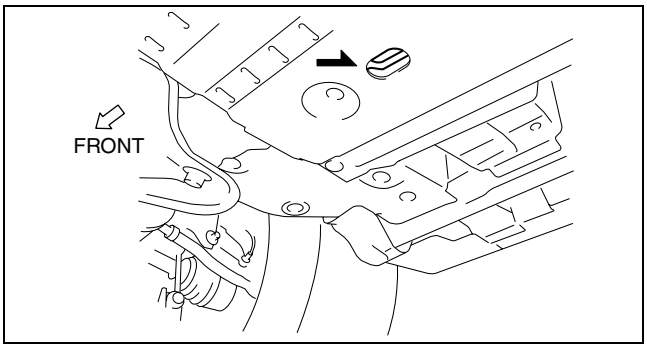
**Caution**

- **Do not use the tie down hook for towing the vehicle. Use it only for securing the vehicle.**

**Front**

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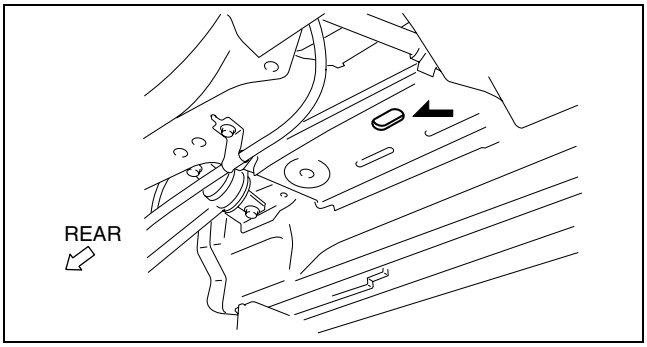
**Rear**

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## IDENTIFICATION NUMBER LOCATIONS

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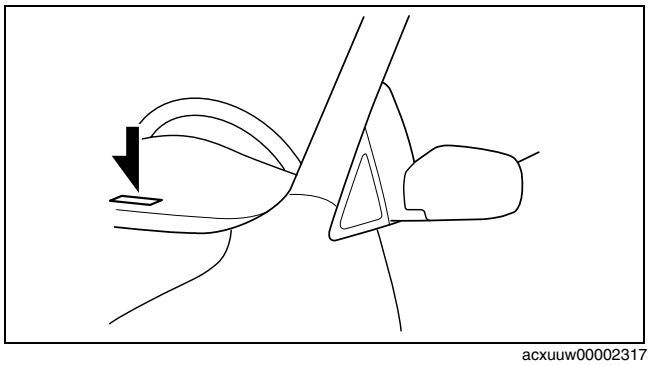
### Vehicle Identification Number (VIN)



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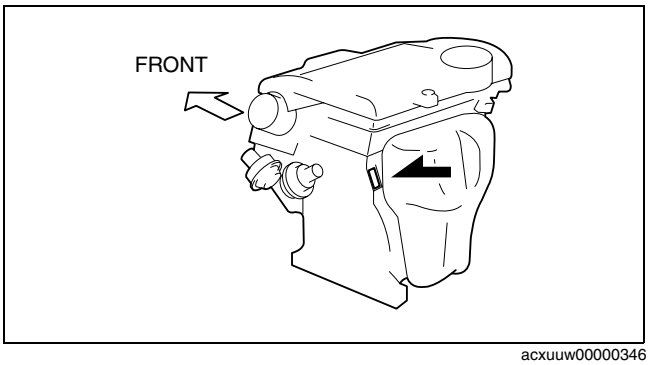
### Engine Identification Number

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## SAE STANDARDS

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- In accordance with new regulations, SAE (Society of Automotive Engineers) standard names and abbreviations are now used in this manual. The table below lists the names and abbreviations that have been used in Mazda manuals up to now and their SAE equivalents.

| SAE Standard | | Remark | | SAE Standard | | Remark |
|---|---|---|---|---|---|---|
| Abbreviation | Name | | | Abbreviation | Name | |
| AP | Accelerator Pedal | | | MAP | Manifold Absolute Pressure | |
| APP | Accelerator Pedal Position | | | MAF sensor | Mass Air Flow Sensor | |
| ACL | Air Cleaner | | | MFL | Multiport Fuel Injection | |
| A/C | Air Conditioning | | | OBD | On-board Diagnostic System | |
| BARO | Barometric Pressure | | | OL | Open Loop | |
| B+ | Battery Positive Voltage | | | OC | Oxidation Catalytic Converter | |
| CMP sensor | Camshaft Position Sensor | | | O2S | Oxygen sensor | |
| CAC | Charge Air Cooler | | | PNP | Park/Neutral Position | |
| CLS | Closed Loop System | | | PSP | Power Steering Pressure | |
| CTP | Closed Throttle Position | | | PCM | Powertrain Control Module | #3 |
| CPP | Clutch Pedal Position | | | PAIR | Pulsed Secondary Air Injection | Pulsed injection |
| CIS | Continuous Fuel Injection System | | | | | |
| CKP sensor | Crankshaft Position Sensor | | | AIR | Secondary Air Injection | Injection with air pump |
| DLC | Data Link Connector | | | | | |
| DTM | Diagnostic Test Mode | #1 | | | | |
| DTC | Diagnostic Test Code(s) | | | SAPV | Secondary Air Pulse Valve | |
| DI | Distributor Ignition | | | SFI | Sequential Multiport Fuel Injection | |
| DLI | Distributorless Ignition | | | | | |
| EI | Electronic Ignition | #2 | | 3GR | Third Gear | |
| ECT | Engine Coolant Temperature | | | TWC | Three Way Catalytic Converter | |
| EM | Engine Modification | | | TB | Throttle Body | |
| EVAP | Evaporative Emission | | | TP sensor | Throttle Position Sensor | |
| EGR | Exhaust Gas Recirculation | | | TCC | Torque Converter Clutch | |
| FC | Fan Control | | | TCM | Transmission (Transaxle) Control Module | |
| FF | Flexible Fuel | | | | | |
| 4GR | Fourth Gear | | | TR | Transmission (Transaxle) Range | |
| GEN | Generator | | | TC | Turbocharger | |
| GND | Ground | | | VSS | Vehicle Speed Sensor | |
| HO2S | Heated Oxygen Sensor | With heater | | VR | Voltage Regulator | |
| | | | | VAF sensor | Volume Air Flow Sensor | |
| IAC | Idle Air Control | | | WU-TWC | Warm Up Three Way Catalytic Converter | #4 |
| IAT | Intake Air Temperature | | | | | |
| KS | Knock Sensor | | | WOP | Wide Open Throttle | |
| MIL | Malfunction Indicator Lamp | | | | | |

#1: Diagnostic trouble codes depend on the diagnostic test mode.
#2: Controlled by the PCM
#3: Device that controls engine and powertrain
#4: Directly connected to exhaust manifold

## ABBREVIATIONS

id000000801000

| | |
|---|---|
| ABS | Antilock Brake System |
| ACC | Accessories |
| ALR | Automatic Locking Retractor |
| ATF | Automatic Transaxle Fluid |
| ATX | Automatic Transaxle |
| AWD | All-Wheel Drive |
| BCM | Body Control Module |
| BTDC | Before Top Dead Center |
| CAL | Calibration ID |
| CAN | Controller Area Network |
| CCM | Comprehensive Component Monitor |
| CM | Control Module |
| CPU | Central Processing Unit |
| DC | Drive Cycle |
| DEF | Defroster |
| DRL | Daytime Running Lamp |
| DSC | Dynamic Stability Control |
| EBD | Electronic Brakeforce Distribution |
| E/L | Electrical Load |
| ELR | Emergency Locking Retractor |
| ETC | Electronic Throttle Control |
| EX | Exhaust |
| GPS | Global Positioning System |
| HI | High |
| HU | Hydraulic Unit |
| HVAC | Heater, Ventilation And Air Conditioning |
| IDS | Integrated Diagnostic Software |
| IG | Ignition |
| IN | Intake |
| INT | Intermittent |
| KOEO | Key On Engine Off |
| KOER | Key On Engine Running |
| LCD | Liquid Crystal Display |
| LED | Light Emitting Diode |
| LF | Left Front |
| LH | Left Hand |
| LO | Low |
| LR | Left Rear |
| LSD | Limited Slip Differential |
| M | Motor |
| MAX | Maximum |
| MIN | Minimum |
| OCV | Oil Control Valve |
| PCV | Positive Crankcase Ventilation |
| PDS | Portable Diagnostic Software |
| PID | Parameter Identification |
| POWER MOS FET | Power Metal Oxide Semiconductor Field Effect Transistor |
| P/S | Power Steering |
| P/W | Power Window |
| RAM | Random Access Memory |
| RF | Right Front |
| RH | Right Hand |
| ROM | Read Only Memory |
| RR | Right Rear |
| SAS | Sophisticated Air Bag Sensor |
| SEN | Sensor |
| SST | Special Service Tool |
| SW | Switch |
| TCS | Traction Control System |
| TDC | Top Dead Center |
| TFT | Transaxle Fluid Temperature |
| TNS | Tail Number Side Lights |
| TPMS | Tire Pressure Monitoring System |
| VENT | Ventilation |
| 1GR | First Gear |
| 2GR | Second Gear |
| 2WD | 2-wheel Drive |
| 3GR | Third Gear |
| 4GR | Fourth Gear |
| 5GR | Fifth Gear |
| 6GR | Sixth Gear |

## PRE-DELIVERY INSPECTION

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**Pre-Delivery Inspection Table**
**Exterior**
**INSPECT and ADJUST, if necessary, the following items to specification:**
❑ Glass, exterior bright metal and paint for damage
❑ Wheel lug nuts
❑ All weatherstrips for damage or detachment
❑ Tire pressures
❑ Headlight cleaner and fluid level (if equipped)
❑ Operation of hood release and lock
❑ Operation of fuel-filler lid opener
❑ Door operation and alignment including side door and back door
❑ Headlight aiming
**INSTALL the following parts:**
❑ Flap (front)
❑ Wheel caps or rings (if equipped)

**Under hood— engine off**
**INSPECT and ADJUST, if necessary, the following items to specification:**
❑ Fuel, engine coolant, and hydraulic lines, fittings, connections, and components for leaks
❑ Engine oil level
❑ Power steering fluid level
❑ Brake fluid level
❑ Washer tank fluid level
❑ Radiator coolant level and specific gravity
❑ Tightness of water hose clamps
❑ Tightness of battery terminals, electrolyte level and specific gravity
❑ Differential oil level

**Interior**
**INSTALL the following items:**
❑ Fuse for accessories
**INSPECT the operations of the following items:**
❑ Seat controls (slide and recline) and headrests
❑ Folding rear seat
❑ Door locks, including childproof door locks
❑ Seat belts and warning system
❑ Ignition switch and steering lock
❑ Transaxle range switch
❑ Warning buzzers
❑ Ignition key reminder alarm
❑ Air bag system using warning light
❑ Cruise control system (if equipped)
❑ Power door lock
❑ Shift-lock system (if equipped)
❑ Starter interlock
❑ All lights including warning, and indicator lights
❑ Horn, wipers, and washers
❑ Wiper blades performance
**Clean wiper blades and windshield, if necessary**
❑ Antenna
❑ Audio system
❑ Cigarette lighter and clock
❑ Power windows (if equipped)
❑ Heater, defroster, and air conditioner at various mode selections (if equipped)
**INSPECT the following items:**
❑ Presence of spare fuse
❑ Upholstery and interior finish
**INSPECT and ADJUST, if necessary, the following items:**
❑ Operation and fit of windows
❑ Parking brake

**Under hood— engine running at operating temperature**
**INSPECT the following items:**
❑ Automatic transaxle fluid level
❑ Operation of idle-up system for electrical load, air conditioner or power steering (if equipped)
❑ Ignition timing
❑ Idle speed
❑ Operation of throttle position sensor
❑ Operation of EGR valve

**On hoist**
**INSPECT the following items:**
❑ Underside fuel, coolant and hydraulic lines, fittings, connections, and components for leaks
❑ Tires for cuts or bruises
❑ Steering linkage, suspension, exhaust system, and all underside hardware for looseness or damage

**Road test**
**INSPECT the following items:**
❑ Brake operation
❑ Steering control
❑ Operation of gauges
❑ Squeaks, rattles, and unusual noises
❑ Engine general performance
❑ Emergency locking retractors and automatic locking retractors
❑ Cruise control system (if equipped)
❑ Operation of meters and gauges, squeaks, rattles, and abnormal noises

**After road test**
**INSPECT for necessary owner information materials, tools, and spare tire in vehicle**
The following items must be completed just before delivery to your customer.
❑ Load test battery and charge if necessary (Load test result: Volts)
❑ Adjust tire pressure to specification (Specified tire pressure is indicated on the door label.)
❑ Clean outside of vehicle
❑ Install fuses for accessories
❑ Remove seat and cabin carpet protective covers
❑ Vacuum inside of vehicle

## SCHEDULED MAINTENANCE

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**Scheduled Maintenance Table for U.S.A., CANADA and Puerto Rico**
**Schedule 1: (Normal Driving Conditions) for U.S.A.**

- The vehicle is mainly operated where none of the “unique driving conditions” apply.
- For CANADA and Puerto Rico, follow schedule 2.

| Maintenance Interval | | Number of months or kilometers (miles), whichever comes first | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Months | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 |
| | × 1000 km | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 |
| | × 1000 miles | 7.5 | 15 | 22.5 | 30 | 37.5 | 45 | 52.5 | 60 |
| **ENGINE** | | | | | | | | | |
| Engine valve clearance | | Audible inspect every 120,000 km (75,000 miles), if noisy, adjust | | | | | | | |
| Drive belts (tension) | | | | | | I | | | |
| Engine oil | | R | R | R | R | R | R | R | R |
| Engine oil filter | | R | R | R | R | R | R | R | R |
| **COOLING SYSTEM** | | | | | | | | | |
| Engine coolant | FL22 type*1 | Replace at first 192,000 km (120,000 miles) or 10 years; after that, every 96,000 km (60,000 miles) or 5 years | | | | | | | |
| | Others | Replace at first 96,000 km (60,000 miles) or 4 years; after that, every 2 years | | | | | | | |
| **FUEL SYSTEM** | | | | | | | | | |
| Air cleaner element | | | | | | R | | | |
| Fuel lines and hoses*2 | | | | | I | | | | I |
| Hoses and tubes for emission*2 | | | | | | | | | I |
| **IGNITION SYSTEM** | | | | | | | | | |
| Spark plugs | | Replace every 120,000 km (75,000 miles) | | | | | | | |
| **CHASSIS and BODY** | | | | | | | | | |
| Brake lines, hoses and connections | | | | | I | | | | I |
| Disc brakes | | | I | | I | | I | | I |
| Tire (Rotation) | | Rotate every 12,000 km (7,500 miles) | | | | | | | |
| Steering operation and linkages | | | | | I | | | | I |
| Front and rear suspension and ball joints | | | | | I | | | | I |
| Rear differential oil | | *3*4 | | | | | | | |
| Transfer oil | | *4 | | | | | | | |
| Drive shaft dust boots | | | | | I | | | | I |
| Exhaust system and heat shields | | Inspect every 72,000 km (45,000 miles) or 5 years | | | | | | | |
| All locks and hinges | | L | L | L | L | L | L | L | L |
| **AIR CONDITIONER SYSTEM (if equipped)** | | | | | | | | | |
| Cabin air filter | | Replace every 40,000 km (25,000 miles) or 2 years | | | | | | | |

**Chart symbols:**
**I: Inspect and repair, clean, adjust, or replace if necessary.**
**R: Replace**
**L: Lubricate**
**Remarks**

- After the prescribed period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked* in the maintenance chart.

*1: Use FL22 type coolant in vehicles with the inscription “FL22” on the radiator cap itself or the surrounding area. Use FL22 when replacing the coolant.

*2: According to state/provincial and federal regulations, failure to perform maintenance on these items will not void your emissions warranties. However, Mazda recommends that all maintenance services be performed at the recommended time or mileage/kilometer period to ensure long-term reliability.

*3: If the vehicle is operated primarily under any of the following conditions, replace the rear differential oil every 45,000 km (28,100 miles).

a. Towing a trailer or using a car - top carrier
b. Driving in dusty, sandy or wet condition
c. Extended periods of idling or low speed operation
d. Repeated short trips of less than 16 km (10 miles)

*4: If this component has been submerged in water, the oil should be replaced.

**Schedule 2: CANADA, Puerto Rico and (Unique Driving Conditions) for U.S.A.**

- Repeated short-distance driving
- Driving in dusty conditions
- Driving with extended use of brakes
- Driving in areas where salt or other corrosive materials are used
- Driving on rough or muddy roads
- Extended periods of idling or low-speed operation
- Driving for long periods in cold temperatures or extremely humid climates

| Maintenance Interval | | Number of months or kilometers (miles), whichever comes first | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Months** | **4** | **8** | **12** | **16** | **20** | **24** | **28** | **32** | **36** | **40** | **44** | **48** |
| | **× 1000 km** | **8** | **16** | **24** | **32** | **40** | **48** | **56** | **64** | **72** | **80** | **88** | **96** |
| | **× 1000 miles** | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **55** | **60** |
| **ENGINE** | | | | | | | | | | | | | |
| Engine valve clearance | | Audible inspect every 120,000 km (75,000 miles), if noisy, adjust | | | | | | | | | | | |
| Drive belts (tension) | | | | | | | | I | | | | | |
| Engine oil | Puerto Rico | Replace every 5,000 km (3,000 miles) or 3 months | | | | | | | | | | | |
| | Others | R | R | R | R | R | R | R | R | R | R | R | R |
| Engine oil filter | | R | R | R | R | R | R | R | R | R | R | R | R |
| **COOLING SYSTEM** | | | | | | | | | | | | | |
| Engine coolant | FL22 type[*1] | Replace at first 192,000 km (120,000 miles) or 10 years; after that, every 96,000 km (60,000 miles) or 5 years | | | | | | | | | | | |
| | Others | Replace at first 96,000 km (60,000 miles) or 4 years; after that, every 2 years | | | | | | | | | | | |
| Engine coolant level | | I | I | I | I | I | I | I | I | I | I | I | I |
| **FUEL SYSTEM** | | | | | | | | | | | | | |
| Air cleaner element | Puerto Rico | | | | | | R | | | | | | R |
| | Others | | | | | | | R | | | | | |
| Fuel lines and hoses[*2] | | | | | | | I | | | | | | I |
| Hoses and tubes for emission[*2] | | | | | | | | | | | | | I |
| **IGNITION SYSTEM** | | | | | | | | | | | | | |
| Spark plugs | U.S.A. | Replace every 96,000 km (60,000 miles) | | | | | | | | | | | |
| | Others[*3] | Replace every 120,000 km (75,000 miles) | | | | | | | | | | | |
| **ELECTRICAL SYSTEM** | | | | | | | | | | | | | |
| Function of all lights | | I | I | I | I | I | I | I | I | I | I | I | I |
| **CHASSIS and BODY** | | | | | | | | | | | | | |
| Brake lines, hoses and connections | | | | | | | I | | | | | | I |
| Brake fluid level | | I | I | I | I | I | I | I | I | I | I | I | I |
| Disc brakes | | | | I | | | I | | | I | | | I |
| Tire (Rotation) | | Rotate every 8,000 km (5,000 miles) | | | | | | | | | | | |
| Tire inflation pressure and tire wear | | I | I | I | I | I | I | I | I | I | I | I | I |
| Steering operation and linkages | | | | | | | I | | | | | | I |
| Power steering fluid level | | I | I | I | I | I | I | I | I | I | I | I | I |
| Front and rear suspension and ball joints | | | | | | | I | | | | | | I |
| Rear differential oil | | [*]4 [*]5 | | | | | | | | | | | |
| Transfer oil | | [*]5 | | | | | | | | | | | |
| Drive shaft dust boots | | | | | | | I | | | | | | I |
| Exhaust system and heat shields | | Inspect every 72,000 km (45,000 miles) or 5 years | | | | | | | | | | | |
| All locks and hinges | | L | L | L | L | L | L | L | L | L | L | L | L |
| Washer fluid level | | I | I | I | I | I | I | I | I | I | I | I | I |
| **AIR CONDITIONER SYSTEM (if equipped)** | | | | | | | | | | | | | |
| Cabin air filter | | Replace every 40,000 km (25,000 miles) or 2 years | | | | | | | | | | | |

**Chart symbols:**
**I: Inspect and repair, clean, adjust, or replace if necessary.**
**R: Replace**
**L: Lubricate**

**Remarks**

- After the prescribed period, continue to follow the described maintenance at the recommended intervals.
- Refer below for a description of items marked* in the maintenance chart.

*1: Use FL22 type coolant in vehicles with the inscription “FL22” on the radiator cap itself or the surrounding area. Use FL22 when replacing the coolant.

*2: According to state/provincial and federal regulations, failure to perform maintenance on these items will not void your emissions warranties. However, Mazda recommends that all maintenance services be performed at the recommended time or mileage/kilometer period to ensure long-term reliability.

*3: If the vehicle is operated primarily under any of the following conditions, replace the spark plugs every 96,000 km (60,000 miles) or shorter.

a. Repeated short-distance driving
b. Extended periods of idling or low-speed operation
c. Driving for long periods in cold temperatures or extremely humid climates

*4: If the vehicle is operated primarily under any of the following conditions, replace the rear differential oil every 45,000 km (28,100 miles).

a. Towing a trailer or using a car - top carrier
b. Driving in dusty, sandy or wet condition
c. Extended periods of idling or low speed operation
d. Repeated short trips of less than 16 km (10 miles)

*5: If this component has been submerged in water, the oil should be replaced.

# ENGINE

# 01
SECTION



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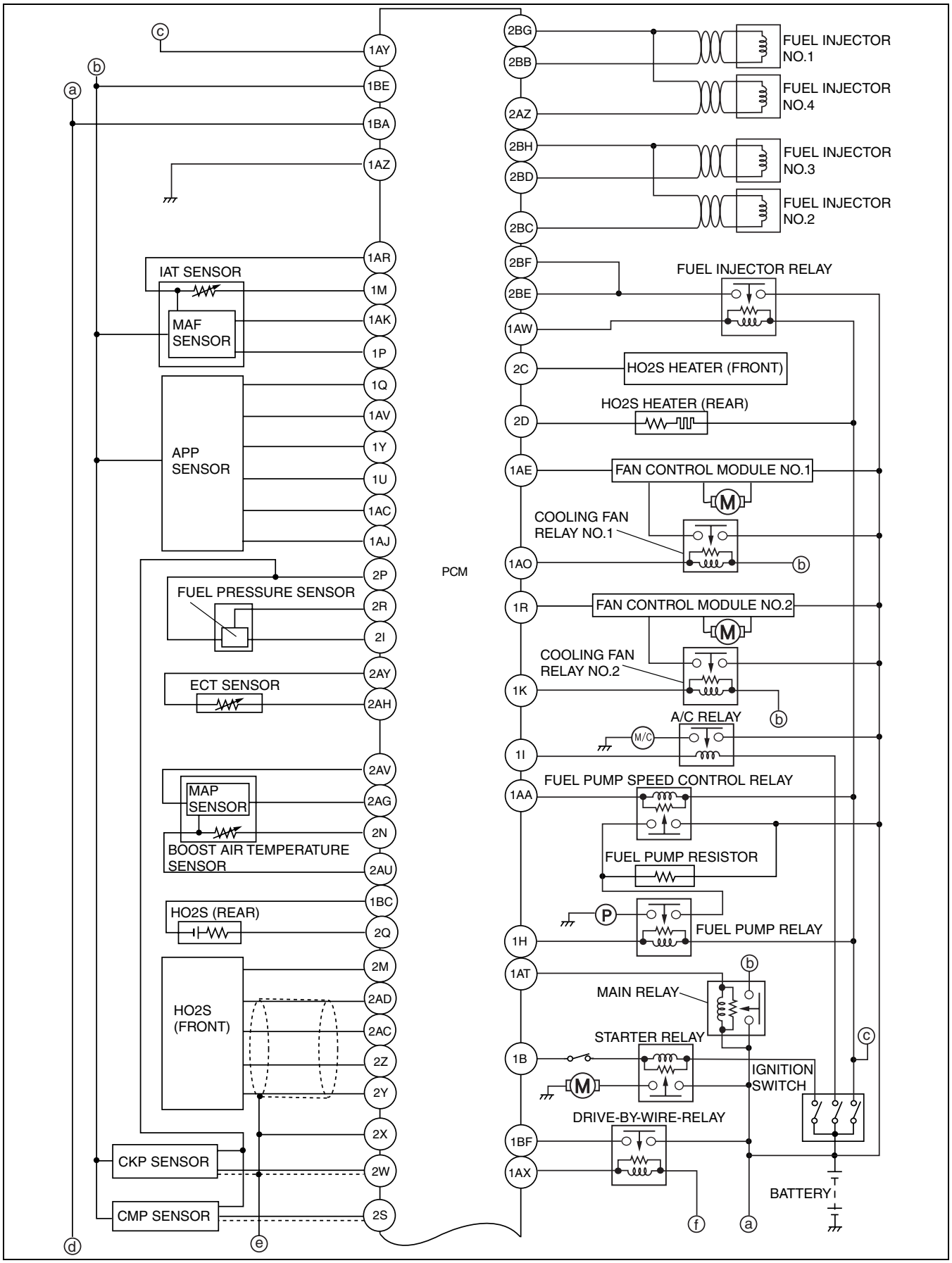
DTC P2102[L3 WITH TC] . . . . . 01-02–202
DTC P2103[L3 WITH TC] . . . . . 01-02–204
DTC P2107[L3 WITH TC] . . . . . 01-02–205
DTC P2108[L3 WITH TC] . . . . . 01-02–206
DTC P2119[L3 WITH TC] . . . . . 01-02–207
DTC P2122[L3 WITH TC] . . . . . 01-02–208
DTC P2123[L3 WITH TC] . . . . . 01-02–210
DTC P2127[L3 WITH TC] . . . . . 01-02–212
DTC P2128[L3 WITH TC] . . . . . 01-02–214
DTC P2135[L3 WITH TC] . . . . . 01-02–216
DTC P2138[L3 WITH TC] . . . . . 01-02–217
DTC P2177[L3 WITH TC] . . . . . 01-02–218
DTC P2178[L3 WITH TC] . . . . . 01-02–220
DTC P2187[L3 WITH TC] . . . . . 01-02–223
DTC P2188[L3 WITH TC] . . . . . 01-02–226
DTC P2195[L3 WITH TC] . . . . . 01-02–229
DTC P2196[L3 WITH TC] . . . . . 01-02–231
DTC P2228[L3 WITH TC] . . . . . 01-02–233
DTC P2229[L3 WITH TC] . . . . . 01-02–234
DTC P2237[L3 WITH TC] . . . . . 01-02–235
DTC P2245[L3 WITH TC] . . . . . 01-02–237
DTC P2246[L3 WITH TC] . . . . . 01-02–239
DTC P2251[L3 WITH TC] . . . . . 01-02–241
DTC P2401[L3 WITH TC] . . . . . 01-02–243
DTC P2402[L3 WITH TC] . . . . . 01-02–246
DTC P2404[L3 WITH TC] . . . . . 01-02–248
DTC P2405[L3 WITH TC] . . . . . 01-02–249
DTC P2407[L3 WITH TC] . . . . . 01-02–250
DTC P2502[L3 WITH TC] . . . . . 01-02–251
DTC P2503[L3 WITH TC] . . . . . 01-02–252
DTC P2504[L3 WITH TC] . . . . . 01-02–254
DTC P2507[L3 WITH TC] . . . . . 01-02–256
DTC P2610[L3 WITH TC] . . . . . 01-02–258

## ON-BOARD DIAGNOSTIC WIRING DIAGRAM[L3 WITH TC]

id010239800100

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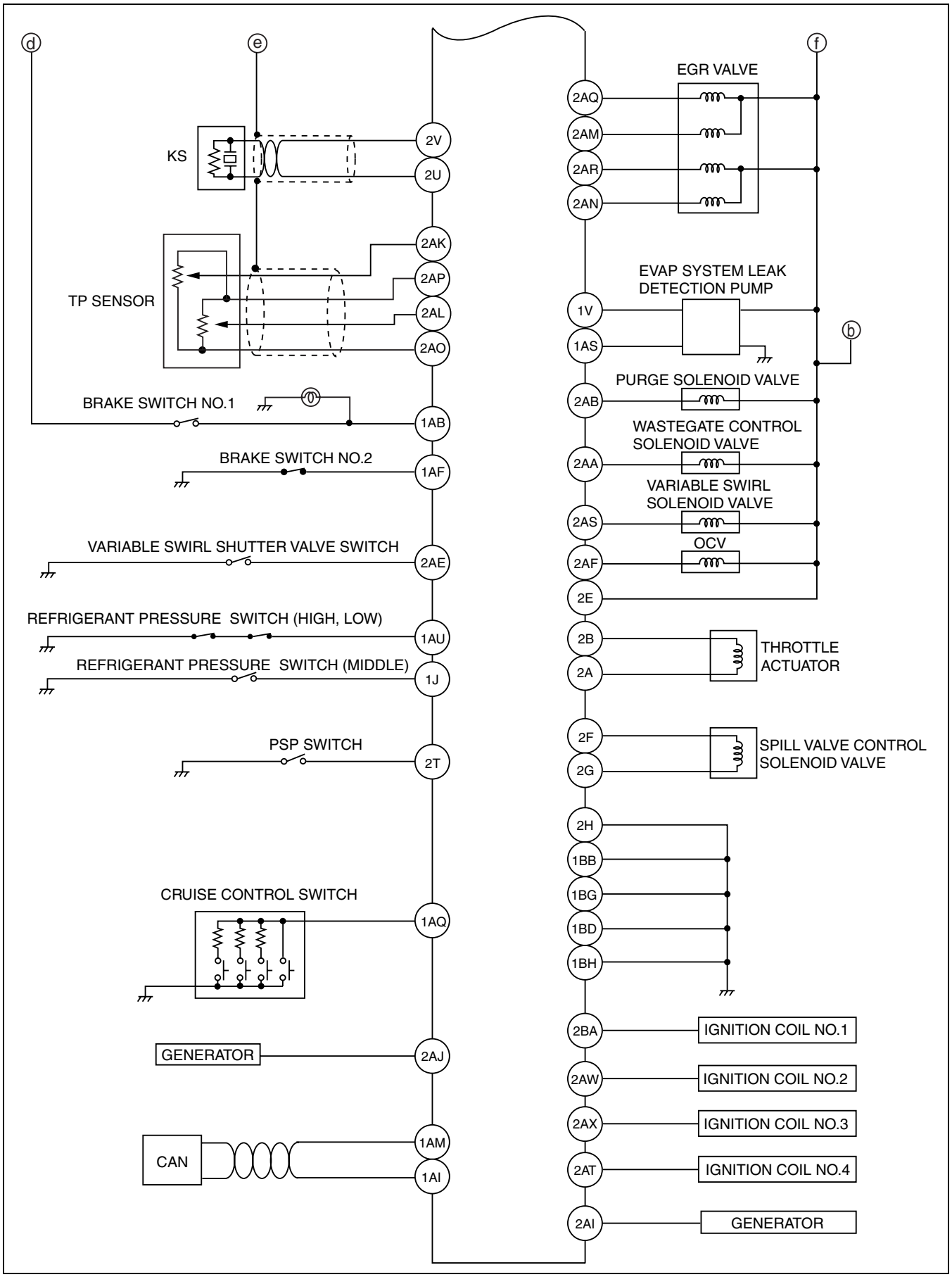


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## MONITORING SYSTEM AND CONTROL SYSTEM DEVICE RELATIONSHIP CHART[L3 WITH TC]

id010239800200

×: Applicable

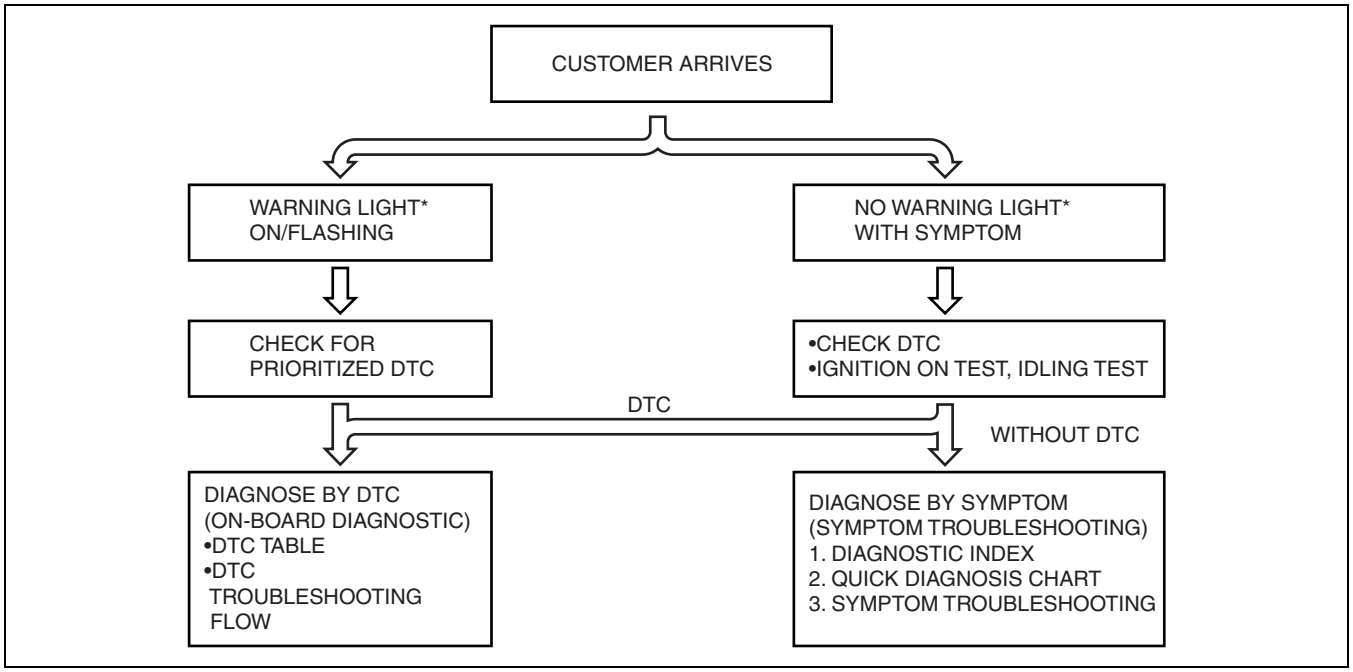


| Component | Oxygen sensor monitor | Oxygen sensor heater monitor | Catalyst monitor | Misfire monitor | Fuel system monitor | Evaporative system monitor | EGR system monitor | Engine cooling system |
|---|---|---|---|---|---|---|---|---|
| **Input** | | | | | | | | |
| Battery | | x | | x | | x | | |
| Ignition switch | x | x | | | | x | | |
| A/C switch, refrigerant pressure switch (high, low pressure) | | | | | | | x | x |
| TP sensor | x | | x | x | x | x | x | |
| ECT sensor | x | x | x | x | x | x | x | x |
| IAT sensor | x | | x | | x | x | x | x |
| MAF sensor | x | x | x | x | x | | x | x |
| HO2S (front) | x | x | x | | x | | | |
| HO2S (rear) | x | x | x | | x | | | |
| Fuel gauge sender unit | | | | | | x | | |
| BARO sensor | x | | | | | x | | |
| MAP sensor | | | | | | | x | |
| CMP sensor | | | | x | | | | |
| CKP sensor | x | x | x | x | x | x | x | x |
| VSS | x | | | | | x | x | x |
| **Output** | | | | | | | | |
| Fuel injector | | | | | x | | | |
| HO2S heater (front) | | x | | | | | | |
| HO2S heater (rear) | | x | | | | | | |
| EGR valve | | | | | | | x | |
| Purge solenoid valve | x | | x | | x | x | | |
| EVAP system leak detection pump | | | | | | x | | |
| MIL | x | x | x | x | x | x | x | x |
| DLC-2 | x | x | x | x | x | x | x | x |

### FOREWORD[L3 WITH TC]

id010239800300

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to the following flowchart.
  - — If a DTC exists, diagnose the applicable DTC inspection. (See 01-02-13 DTC TABLE[L3 WITH TC].)
  - — If a DTC does not exist and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03-8 QUICK DIAGNOSTIC CHART[L3 WITH TC].)

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*: Malfunction Indicator Lamp (MIL), Generator Warning Light, Security Light

### OBD-II PENDING TROUBLE CODE[L3 WITH TC]

id010239800400

- These appear when a problem is detected in a monitored system. The code for a failed system is stored in the PCM memory in the first drive cycle. This code is called the pending code. If the PCM determines that the system has returned to normal or the problem was mistakenly detected, it deletes the pending code. If the problem is found in the second drive cycle, too the PCM determines that the system is malfunctioning, and the DTC is stored.

### OBD-II FREEZE FRAME DATA[L3 WITH TC]

id010239800500

- This is technical data which indicates the engine condition at the time of the first malfunction. This data will remain in the memory even if another emission-related DTC is stored, with the exception of the Misfire or Fuel System DTCs. Once freeze frame data for the Misfire or Fuel System DTC is stored, it will overwrite any previous data and the freeze frame will not be overwritten again.

### OBD-II ON-BOARD SYSTEM READINESS TEST[L3 WITH TC]

id010239800600

- This shows the OBD-II systems operating status. If any monitor function is incomplete, the M-MDS will identify which monitor function has not been completed. Misfires, Fuel System and Comprehensive Components (CCM) are continuous monitoring-type functions. The catalyst, EGR system, evaporation system and oxygen sensor will be monitored under drive cycles. The OBD-II diagnostic system is initialized by performing the DTC cancellation procedure or disconnecting the negative battery cable.

### OBD-II READ/CLEAR DIAGNOSTIC TEST RESULTS[L3 WITH TC]

id010239800800

- This retrieves all stored DTCs in the PCM and clears the DTC, Freeze Frame Data, On-Board Readiness Test Results, Diagnostic Monitoring Test Results and Pending Trouble Codes.

### OBD-II PARAMETER IDENTIFICATION (PID) ACCESS[L3 WITH TC]

id010239800900

- The PID mode allows access to certain data values, analog and digital inputs and outputs, calculated values and system status information. Since PID values for output devices are PCM internal data values, inspect each device to identify which output devices are malfunctioning.

### OBD-II DIAGNOSTIC MONITORING TEST RESULTS[L3 WITH TC]

id010239800700

- These result from the intermittent monitor system technical data, which are used to determine whether the system is normal or not. They also display the system's thresholds and diagnostic results. The intermittent monitor system monitors the oxygen sensor, EVAP purge system, catalyst and the EGR system.

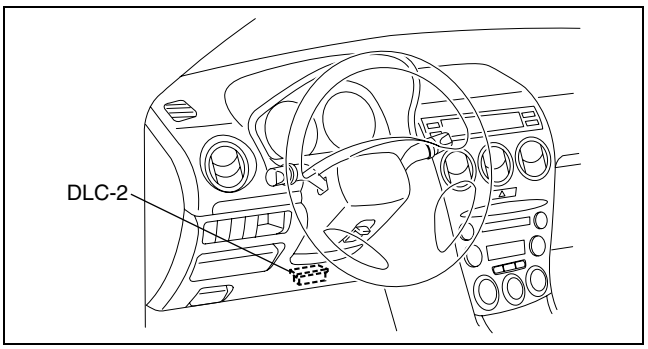
### ON-BOARD DIAGNOSTIC TEST[L3 WITH TC]

id010239801000



**DTC Reading Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the "Toolbox" tab.
     2. Select "Self Test".
     3. Select "Module".
     4. Select "PCM".
   - When using the PDS (pocket PC)
     1. Select "Module Tests".
     2. Select "PCM".
     3. Select "Self Test".
3. Then, select the "Retrieve CMDTCs" and perform procedures according to directions on the M-MDS screen.
4. Verify the DTC according to the directions on the M-MDS screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
5. After completion of repairs, clear all DTCs stored in the PCM, while referring to "AFTER REPAIR PROCEDURE".



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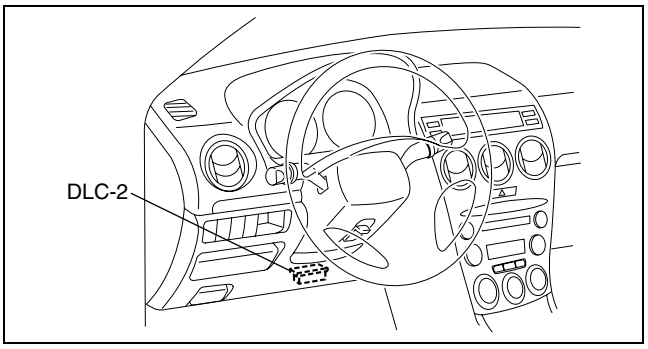
**Pending Trouble Code Access Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the "Toolbox" tab.
     2. Select "Self Test".
     3. Select "Module".
     4. Select "PCM".
   - When using the PDS (pocket PC)
     1. Select "Module Tests".
     2. Select "PCM".
     3. Select "Self Test".
3. Then, select the "Retrieve CMDTCs" and perform procedures according to directions on the M-MDS screen.
4. Retrieve the pending trouble codes according to the directions on the M-MDS screen.



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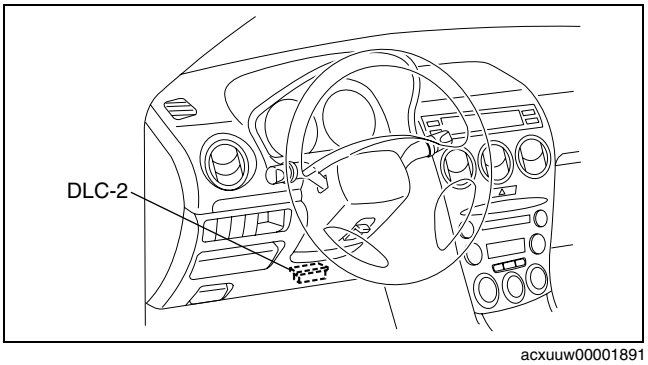
**Freeze Frame PID Data Access Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the "Toolbox" tab.
     2. Select "Self Test".
     3. Select "Module".
     4. Select "PCM".
   - When using the PDS (pocket PC)
     1. Select "Module Tests".
     2. Select "PCM".
     3. Select "Self Test".
3. Then, select the "Retrieve CMDTCs" and perform procedures according to directions on the M-MDS screen.
4. Retrieve the freeze frame PID data according to the directions on the M-MDS screen.



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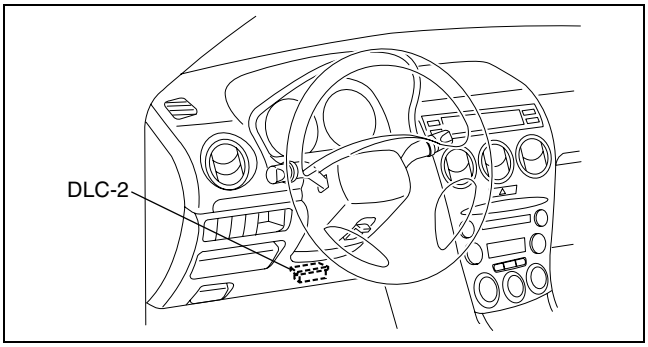
**On-Board System Readiness Tests Access Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Powertrain”.
     3. Select “OBD Test Modes”.
     4. Select “Mode 1 Powertrain Data”.
   - When using the PDS (pocket PC)
     1. Select “OBD II Modes”.
     2. Select “Mode 1 Powertrain Data”.
3. Then, select the “***SUP” and “***EVAL” PIDs in the PID selection screen.
4. Monitor those PIDs and check it system monitor is completed.



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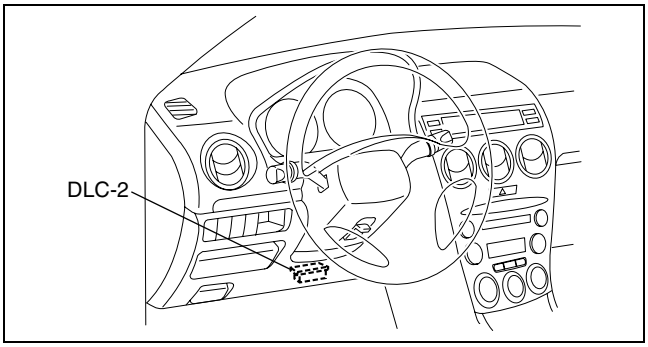
**PID/DATA Monitor and Record Procedure**

**Note**

- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the PCM. Therefore, an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device. If a monitored value of an output device is out of specification, inspect the monitored value of the input device related to the output control.

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “PCM”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “DataLogger”.
3. Select the PID from the PID table.
4. Verify the PID data according to the directions on the screen.



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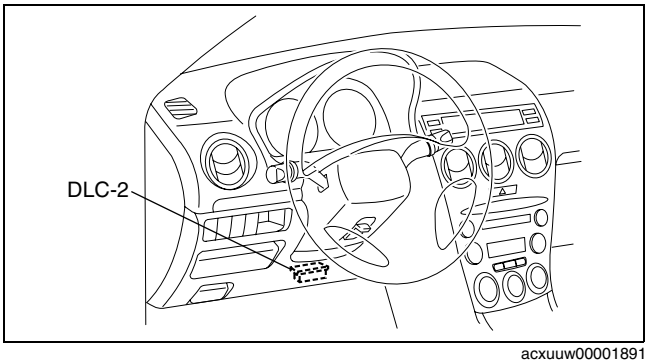
**Diagnostic Monitoring Test Results Access Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Powertrain”.
     3. Select “OBD Test Modes”.
     4. Select “Mode 6 On-Board Test Results”.
   - When using the PDS (pocket PC)
     1. Select “OBD II Modes”.
     2. Select “Mode 6 On-Board Test Results”.
3. Verify the diagnostic monitoring test result according to the directions on the screen.



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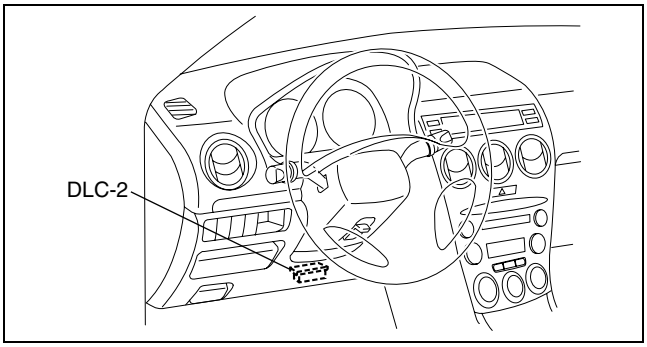
**Simulation Function Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “PCM”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “DataLogger”.
3. Select the simulation items from the PID table.
4. Perform the simulation function, inspect the operations for each parts.
   - If there is no operation sound from the relay, motor, and solenoid after the simulation function inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.

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**DIAGNOSTIC MONITORING TEST RESULTS[L3 WITH TC]**

id010239801400

- The purpose of this test mode is to confirm the result of the OBD-II monitor diagnostic test results. The result values stored when a particular monitor is completed are displayed. If the monitor is not completed, the initial value is displayed.

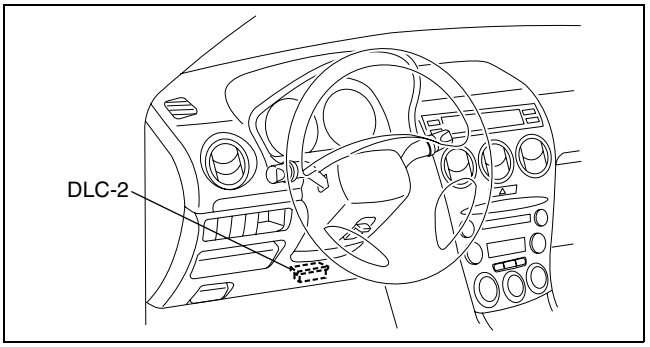
| TEST ID | Description | Related system |
|---|---|---|
| 10: 01: 80 | HO2S (Front) lean-to-rich response time (calculated) | HO2S |
| 10: 02: 03 | Low HO2S (Rear) voltage for switch time calculation (constant) | |
| 10: 02: 04 | High HO2S (Rear) voltage for switch time calculation (constant) | |
| 10: 02: 05 | HO2S (Rear) rich-to-lean response time (calculated) | |
| 10: 21: 80 | Front and HO2S (Rear) switching time ratio | Catalyst |
| 10: 31: 83 | EGR pressure variation | EGR |
| 10: 3A: 80 | EVAP system leak detection pump gross leak check | EVAP |
| 10: 3B: 80 | EVAP system leak detection pump small leak check | |
| 10: 3C: 80[*1] | EVAP system leak detection pump very small leak check | |
| 10: 3D: 80 | Purge flow monitor | |
| 10: A2: 0B | EWMA misfire counts for last 10 driving cycles | Misfire |
| 10: A2: 0C | Misfire counts for last/current driving cycles | |
| 10: A3: 0B | EWMA misfire counts for last 10 driving cycles | |
| 10: A3: 0C | Misfire counts for last/current driving cycles | |
| 10: A4: 0B | EWMA misfire counts for last 10 driving cycles | |
| 10: A4: 0C | Misfire counts for last/current driving cycles | |
| 10: A5: 0B | EWMA misfire counts for last 10 driving cycles | |
| 10: A5: 0C | Misfire counts for last/current driving cycles | |
| 10: E1: 80 | Heat radiation ratio | Engine cooling system |
| 10: E1: 81 | Misfire counts for last/current driving cycles | |

[*1] : California emission regulation applicable model

### AFTER REPAIR PROCEDURE[L3 WITH TC]

id010239801100

1. Connect the M-MDS to the DLC-2.
2. Cycle the ignition switch from the off to the ON position.
3. Any retrieved DTCs.
4. Clear all diagnostic data using the M-MDS.

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### KOEO/KOER SELF TEST[L3 WITH TC]

id010239801200

1. Perform the necessary vehicle preparation and visual inspection.
2. Connect the M-MDS to the vehicle DLC-2 16-pin connector located in the driver compartment.
3. Retrieve the KOEO/KOER DTCs using the M-MDS.

### OBD-II DRIVE MODE[L3 WITH TC]

id010239801300

- Using the OBD-II drive mode, the monitoring item requested by OBD-II regulations can be easily diagnosed.
- Performing the Drive Mode inspects the OBD-II system for proper operation and must be performed to ensure that no additional DTCs are present.
- The OBD-II drive mode is divided into the specific drive mode and single drive mode.
- For the specific drive mode, specified drive modes have been set for each individual monitoring item requested by OBD-II regulations, and they can be diagnosed individually. For the single drive mode, the entire monitoring item requested by OBD-II regulations can be diagnosed.
- The following modes are in the specific drive mode. The applicable system is diagnosed by driving in the following drive modes.
  - — PCM Adaptive Memory Produce Drive Mode
  - — EGR System Repair Verification Drive Mode
  - — HO2S heater, HO2S, and TWC Repair Verification Drive Mode
  - — EVAP System Repair Verification Drive Mode
- The following systems are diagnosed with the single drive mode.
  - — EGR system
  - — Oxygen sensor (HO2S)
  - — Oxygen sensor heater
  - — Catalytic converter (TWC)
  - — Fuel, misfire and evaporative (EVAP) system

**Caution**

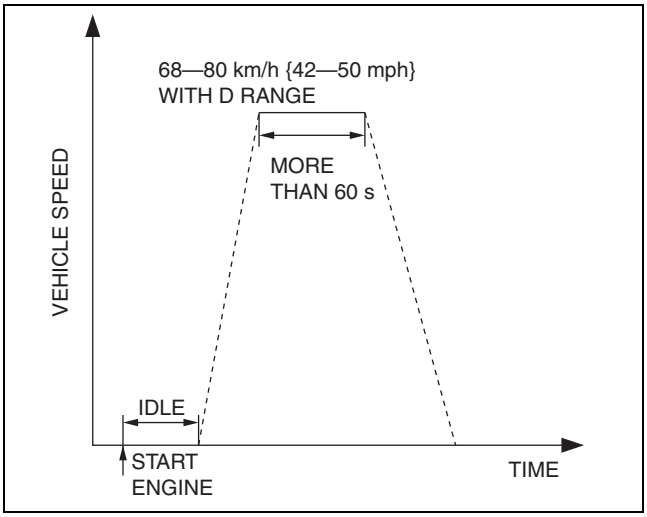
- **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**
- **When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD function and inspect later.**

**Note**

- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the M-MDS to monitor vehicle speed.
- If the OBD-II system inspection is not completed during the Drive Mode, the following causes are considered:
  - — The OBD-II system detects the malfunction.
  - — The Drive Mode procedure is not completed correctly.
- Disconnecting the battery will reset the memory. Do not disconnect the battery during and after Drive Mode.
- The M-MDS can be used at anytime through the course of the Drive Mode to monitor the completion status. Monitoring can be done by viewing the ON BOARD SYSTEM READINESS menu.
- The OBD monitoring status can be confirmed with the ignition switch operation. During KOEO, the MIL illuminates for a fail-light inspection for **approx. 17 s**. The OBD monitoring status is confirmed after the fail-light inspection.
  - — If all of the diagnosis is completed even one time, the MIL will continue to illuminate.
  - — If all of the diagnosis is not completed, the MIL flashes for **approx. 7 s**, and then it illuminates until the engine is started.

**EGR System Repair Verification Drive Mode**

1. Perform “PCM Adaptive Memory Production Drive Mode” first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph.
4. Stop the vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD-II FUNCTION to verify the OBD monitoring status.
   - If completed, the OBD monitoring status items change from non-completed to completed.
   - If not completed, turn the ignition switch off then repeat from Step 3.
5. Access DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD-II FUNCTIONS to verify the monitor results.
   - If detected values are not within specification, repair has not been completed.
6. Verify no DTCs are available.

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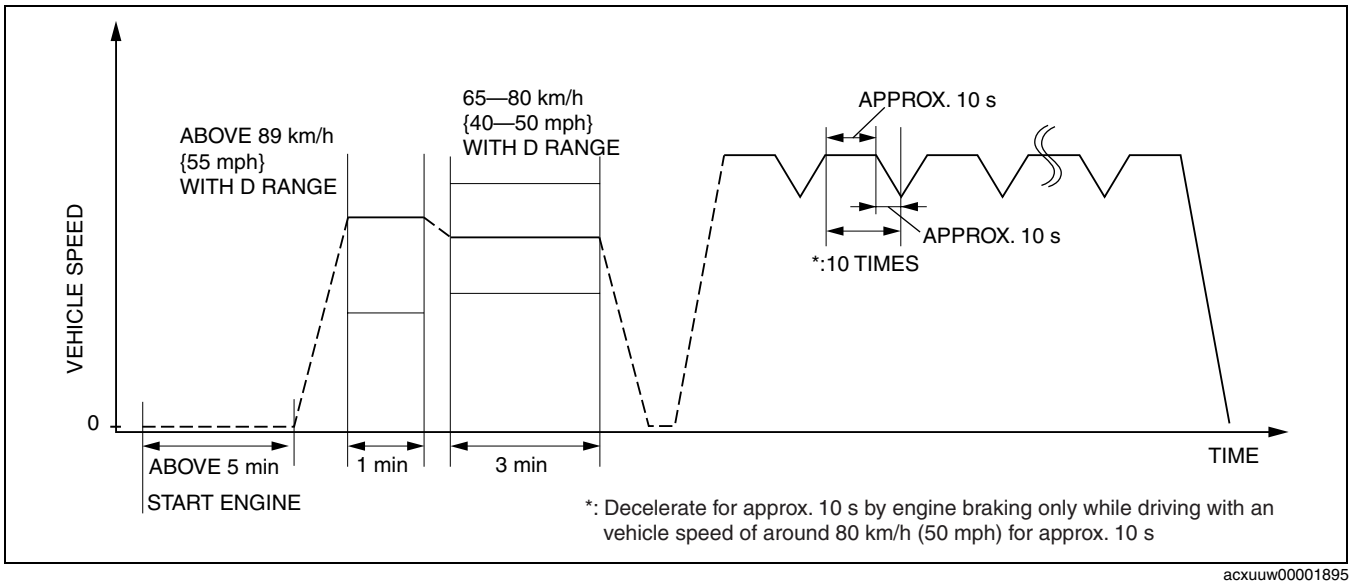
**HO2S heater, HO2S, and TWC Repair Verification Drive Mode**

1. Perform “PCM Adaptive Memory Production Drive Mode” first.
2. Verify all accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
3. Drive the vehicle as shown in the graph. The driving conditions before driving at constant speed are not specified.

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4. Stop the vehicle and access ON BOARD SYSTEM READINESS menu of GENERIC OBD-II FUNCTION to verify the OBD monitoring status.
   - If completed, the OBD monitoring status items change from non-completed to completed.
   - If not completed, turn the ignition switch off then repeat from Step 3.
5. Access DIAGNOSTIC MONITORING TEST RESULTS menu of GENERIC OBD-II FUNCTIONS to verify the monitor results.
   - If detected values are not within the specification, repair has not been completed.
6. Verify no DTCs are available.

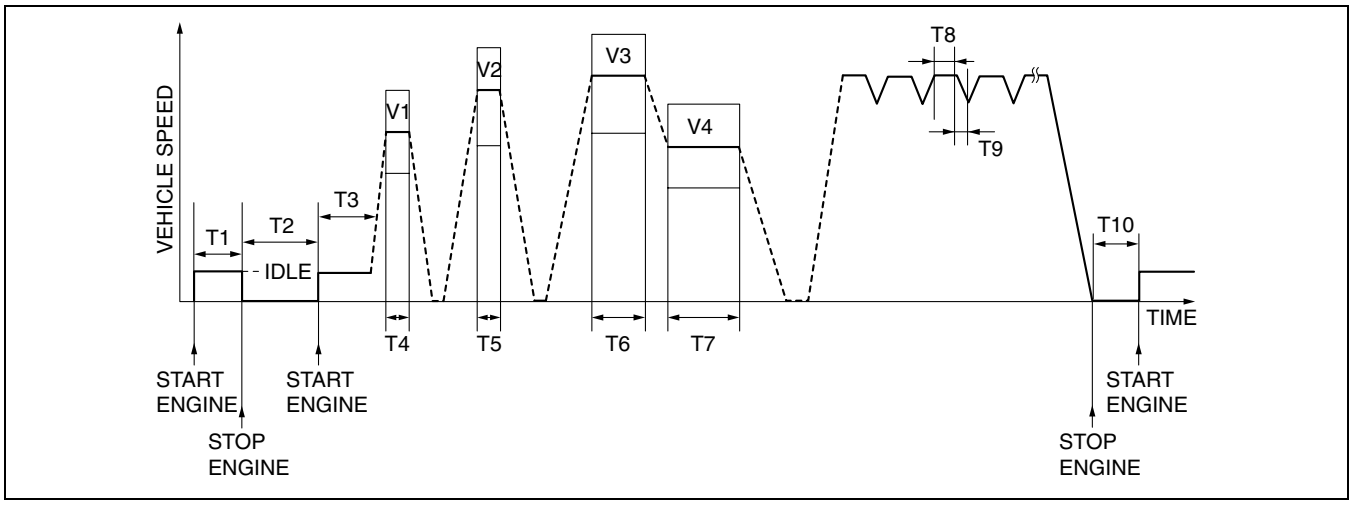
**EVAP System Repair Verification Drive Mode**

**Note**
- If “EVAP System Repair Verification Drive Mode” cannot be performed (it is impossible to drive the vehicle under this drive mode condition), perform the EVAP system test procedure as an alternative.

1. Verify that all of the following PIDs are within the following specifications. All PIDs must be within specifications before the engine is started to initiate the EVAP system test.
   - BARO: **above 72.2 kPa {542 mmHg, 21.3 inHg}**
   - IAT: **5— 35 °C {41— 95 °F}**
   - FTL: **15— 85%**
   - B+: **above 10.9 V**
2. Clear the DTC from the PCM memory using the M-MDS.
3. Turn the ignition switch off.
4. Leave the vehicle for **5 hours or more.**
5. Start the engine and idle it for **more than 5 min.**
6. Drive the vehicle at an engine speed of **65— 80 km/h {40— 50 mph} for more than 5 min.**
7. Stop the vehicle and the turn ignition switch off.
8. Leave vehicle as it is for **5.5 hours or more.**
9. Start the engine.
10. Access the ON BOARD SYSTEM READINESS to verify the OBD monitoring status.
    - If completed, the OBD monitoring status items change from non-completed to completed.
    - If not completed, turn the ignition switch off then go back to Step 1.
11. Access the DIAGNOSTIC MONITORING TEST RESULTS to verify the monitor results.
    - If detected values are not within specification, the repair has not been completed.
12. Verify that no DTCs are present.

**PCM Adaptive Memory Production, EGR, HO2S heater, HO2S, TWC, and EVAP System Repair Verification Drive Mode**

1. Start the engine and warm it up completely.
2. Clear the DTC from the PCM memory using the M-MDS.
3. Verify the following conditions and correct if necessary:
   - All accessory loads (A/C, headlights, blower fan, rear window defroster) are off.
4. Verify that all of the following PIDs are within the following specifications. All PIDs must be within specifications from Step 5 to 6.
   - BARO: **above 72.2 kPa {542 mmHg, 21.3 inHg}**
   - IAT: **5— 35 °C {41— 95 °F}**
   - FTL: **15— 85%**
   - B+: **above 10.9 V**
5. With the vehicle stopped, race the engine at the engine speed indicated, and then drive the vehicle as shown in the graph. The driving conditions before driving at constant speed are not specified. If possible, monitor RPM PID for engine speed during this procedure.

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| Step | Time | Engine speed (rpm) | Vehicle speed (km/h {mph}) | Vehicle condition |
|---|---|---|---|---|
| 1 | T1: More than 10 s | N3: Idle | 0 {0} | Idle the engine after the cooling fan has stopped |
| 2 | T2: More than 5 h | 0 | 0 {0} | Keep the ignition switch off |
| 3 | T3: More than 5 min | Idle | V1: 0 {0} | — |
| 4 | T4: 5 min | — | V2: 65— 80 {40— 50} | D RANGE |
| 5 | T5: 1 min | — | V3: 70— 78 {43— 49} | D RANGE |
| 6 | T6: 1 min | — | V4: Above 89 {55} | D RANGE |
| 7 | T7: 3 min | — | V5: 65— 80 {40— 50} | D RANGE |
| 8 | T8: Approx. 10 s | Approx. 80 km/h (50mph) | — | — |
| 9 | T9: Approx. 10 s | — | — | Decelerate by engine braking only (10 times) |
| 10 | T10: More than 5.5 h | 0 | 0 {0} | Keep the ignition switch off |

6. Turn the ignition switch off.
7. Access the ON BOARD SYSTEM READINESS to verify the OBD monitoring status.
   - If completed, all of the OBD monitoring status items change from non-completed to completed.
   - If not completed, turn the ignition switch off, then perform the applicable specific drive mode for any monitoring item that was not in the detection condition.
8. Access the DIAGNOSTIC MONITORING TEST RESULTS to verify the monitor results.
   - If detected values are not within specification, the repair has not been completed.

**DTC TABLE[L3 WITH TC]**

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×: Applicable
— : Not applicable

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| B1342 | PCM malfunction | OFF | 1 | CCM | C, O | × | (See01-02-21 DTC B1342[L3 WITH TC].) |
| P0011 | CMP Timing over-advanced | ON | 2 | CCM | C, R | × | (See01-02-22 DTC P0011[L3 WITH TC].) |
| P0012 | CMP Timing over-retarded | ON | 2 | CCM | C, R | × | (See01-02-23 DTC P0012[L3 WITH TC].) |
| P0016 | CKP-CMP correlation | ON | 2 | CCM | C | × | (See01-02-25 DTC P0016[L3 WITH TC].) |
| P0030 | Front HO2S heater control circuit problem | ON | 2 | HO2S heater | C, O, R | × | (See01-02-26 DTC P0030[L3 WITH TC].) |
| P0031 | Front HO2S heater circuit low input | ON | 2 | HO2S heater | C, O, R | × | (See01-02-28 DTC P0031[L3 WITH TC]) |
| P0032 | Front HO2S heater circuit high input | ON | 2 | HO2S heater | C, O, R | × | (See01-02-30 DTC P0032[L3 WITH TC].) |
| P0037 | Rear HO2S heater circuit low input | ON | 2 | HO2S heater | C, O, R | × | (See01-02-32 DTC P0037[L3 WITH TC].) |
| P0038 | Rear HO2S heater circuit high input | ON | 2 | HO2S heater | C, O, R | × | (Se01-02-34 DTC P0038[L3 WITH TC].) |
| P0069 | Manifold absolute pressure/ atmospheric pressure correlation | ON | 2 | CCM | C | × | (See01-02-36 DTC P0069[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0089 | Fuel pressure regulator performance | OFF | 1 | Other | C, O, R | × | (See01-02-37 DTC P0089[L3 WITH TC].) |
| P0091 | Fuel pressure regulator control circuit low | ON | 1 | CCM | C, O, R | × | (See01-02-38 DTC P0091[L3 WITH TC]) |
| P0092 | Fuel pressure regulator control circuit high | ON | 1 | CCM | C, O, R | × | (See01-02-40 DTC P0092[L3 WITH TC].) |
| P0096 | IAT sensor 2 circuit range/ performance problem | ON | 2 | CCM | C | × | (See01-02-42 DTC P0096[L3 WITH TC].) |
| P0097 | IAT sensor 2 circuit low | ON | 1 | CCM | C, O, R | × | (See01-02-44 DTC P0097[L3 WITH TC].) |
| P0098 | IAT sensor 2 circuit high | ON | 1 | CCM | C, O, R | × | (See01-02-46 DTC P0098[L3 WITH TC].) |
| P0101 | MAF circuit range/performance problem | ON | 2 | CCM | C | × | (See01-02-48 DTC P0101[L3 WITH TC].) |
| P0102 | MAF circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-50 DTC P0102[L3 WITH TC].) |
| P0103 | MAF circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-52 DTC P0103[L3 WITH TC].) |
| P0107 | MAP sensor circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-54 DTC P0107[L3 WITH TC].) |
| P0108 | MAP sensor circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-56 DTC P0108[L3 WITH TC].) |
| P0111 | IAT circuit performance problem | ON | 2 | CCM | C | × | (See01-02-58 DTC P0111[L3 WITH TC].) |
| P0112 | IAT circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-59 DTC P0112[L3 WITH TC].) |
| P0113 | IAT circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-61 DTC P0113[L3 WITH TC].) |
| P0116 | ECT circuit range/performance problem | ON | 1 | Engine cooling system | C | × | (See01-02-63 DTC P0116[L3 WITH TC].) |
| P0117 | ECT circuit low input | ON | 1 | Engine cooling system | C, O, R | × | (See01-02-64 DTC P0117[L3 WITH TC].) |
| P0118 | ECT circuit high input | ON | 1 | Engine cooling system | C, O, R | × | (See01-02-66 DTC P0118[L3 WITH TC].) |
| P0122 | TP sensor No.1 circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-68 DTC P0122[L3 WITH TC].) |
| P0123 | TP sensor No.1 circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-70 DTC P0123[L3 WITH TC].) |
| P0125 | Excessive time to enter closed loop fuel control | ON | 2 | Engine cooling system | C | × | (See01-02-72 DTC P0125[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0126 | Coolant thermostat stuck open | ON | 2 | Engine cooling system | C | × | (See01-02-74 DTC P0126, P0128[L3 WITH TC].) |
| P0128 | Coolant thermostat stuck open | ON | 2 | Engine cooling system | C | × | |
| P0131 | Front HO2S circuit low input | ON | 2 | HO2S | C, O, R | × | (See01-02-76 DTC P0131[L3 WITH TC].) |
| P0132 | Front HO2S circuit high input | ON | 2 | HO2S | C, O, R | × | (See01-02-79 DTC P0132[L3 WITH TC].) |
| P0133 | Front HO2S circuit problem | ON | 2 | HO2S | C | × | (See01-02-81 DTC P0133[L3 WITH TC].) |
| P0134 | Front HO2S circuit no activity detected | ON | 2 | HO2S | C, R | × | (See01-02-83 DTC P0134[L3 WITH TC].) |
| P0137 | Rear HO2S circuit low input | ON | 2 | HO2S | C, O, R | × | (See01-02-86 DTC P0137[L3 WITH TC].) |
| P0138 | Rear HO2S circuit high input | ON | 2 | HO2S | C, O, R | × | (See01-02-88 DTC P0138[L3 WITH TC].) |
| P0139 | Rear HO2S circuit malfunction | ON | 2 | HO2S | C | × | (See01-02-90 DTC P0139[L3 WITH TC].) |
| P0140 | Rear HO2S circuit no activity detected | ON | 2 | HO2S | C, R | × | (See01-02-92 DTC P0140[L3 WITH TC].) |
| P0192 | Fuel rail pressure sensor circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-95 DTC P0192[L3 WITH TC].) |
| P0193 | Fuel rail pressure sensor circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-96 DTC P0193[L3 WITH TC].) |
| P0201 | Injector circuit/open cylinder No.1 | ON | 1 | CCM | C, R | × | (See01-02-98 DTC P0201[L3 WITH TC].) |
| P0202 | Injector circuit/open cylinder No.2 | ON | 1 | CCM | C, R | × | (See01-02-101 DTC P0202[L3 WITH TC].) |
| P0203 | Injector circuit/open cylinder No.3 | ON | 1 | CCM | C, R | × | (See01-02-103 DTC P0203[L3 WITH TC].) |
| P0204 | Injector circuit/open cylinder No.4 | ON | 1 | CCM | C, R | × | (See01-02-105 DTC P0204[L3 WITH TC].) |
| P0222 | TP sensor No.2 circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-107 DTC P0222[L3 WITH TC].) |
| P0223 | TP sensor No.2 circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-109 DTC P0223[L3 WITH TC].) |
| P0234 | Turbo/supercharger overboost condition | OFF | 1 | Other | C, R | × | (See01-02-111 DTC P0234[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0245 | Turbocharger wastegate solenoid low | OFF | 2 | Other | C, O, R | × | (See01-02-112 DTC P0245[L3 WITH TC].) |
| P0246 | Turbocharger wastegate solenoid high | OFF | 2 | Other | C, O, R | × | (See01-02-114 DTC P0246[L3 WITH TC].) |
| P0300 | Random misfire detected | Flash / ON | 1 or 2 | Misfire | C, R | × | (See01-02-115 DTC P0300[L3 WITH TC].) |
| P0301 | Cylinder No.1 misfire detected | Flash / ON | 1 or 2 | Misfire | C, R | × | (See01-02-119 DTC P0301, P0302, P0303, P0304[L3 WITH TC].) |
| P0302 | Cylinder No.2 misfire detected | Flash / ON | 1 or 2 | Misfire | C, R | × | |
| P0303 | Cylinder No.3 misfire detected | Flash / ON | 1 or 2 | Misfire | C, R | × | |
| P0304 | Cylinder No.4 misfire detected | Flash / ON | 1 or 2 | Misfire | C, R | × | |
| P0327 | Knock sensor circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-122 DTC P0327[L3 WITH TC].) |
| P0328 | Knock sensor circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-124 DTC P0328[L3 WITH TC].) |
| P0335 | CKP sensor circuit malfunction | ON | 1 | CCM | C | × | (See01-02-126 DTC P0335[L3 WITH TC].) |
| P0340 | CMP sensor circuit malfunction | ON | 1 | CCM | C | × | (See01-02-128 DTC P0340[L3 WITH TC].) |
| P0401 | EGR flow insufficient detected | ON | 2 | EGR | C, R | × | (See01-02-131 DTC P0401[L3 WITH TC].) |
| P0403 | EGR valve (stepper motor) circuit malfunction | ON | 2 | CCM | C, O, R | × | (See01-02-133 DTC P0403[L3 WITH TC].) |
| P0421 | Catalyst system efficiency below threshold | ON | 2 | Catalyst | C | × | (See01-02-135 DTC P0421[L3 WITH TC].) |
| P0441 | EVAP control system incorrect purge flow | ON | 2 | EVAP system monitor | C, R | × | (See01-02-137 DTC P0441[L3 WITH TC].) |
| P0442 | EVAP control system leak detected (small leak) | ON | 2 | EVAP system monitor | C, R | × | (See01-02-139 DTC P0442[L3 WITH TC].) |
| P0443 | EVAP control system purge control valve circuit malfunction | ON | 2 | CCM | C, O, R | × | (See01-02-140 DTC P0443[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0446 | Change over valve (COV) (EVAP system leak detection pump) stuck close | ON | 2 | CCM | C, R | × | (See01-02-142 DTC P0446[L3 WITH TC].) |
| P0455 | EVAP control system leak detected (gross leak) | ON | 2 | EVAP system monitor | C, R | × | (See01-02-144 DTC P0455[L3 WITH TC].) |
| P0456*1 | EVAP control system leak detected (very small leak) | ON | 2 | EVAP system monitor | C, R | × | (See01-02-147 DTC P0456[L3 WITH TC].) |
| P0461 | Fuel gauge sender unit circuit range/ performance | ON | 2 | CCM | C | × | (See01-02-149 DTC P0461[L3 WITH TC].) |
| P0462 | Fuel gauge sender unit circuit low input | ON | 2 | CCM | C, O, R | × | (See01-02-150 DTC P0462[L3 WITH TC].) |
| P0463 | Fuel gauge sender unit circuit high input | ON | 2 | CCM | C, O, R | × | (See01-02-151 DTC P0463[L3 WITH TC].) |
| P0480 | Fan relay No.1 control circuit malfunction | OFF | 1 | Other | C, O, R | × | (See01-02-152 DTC P0480[L3 WITH TC].) |
| P0481 | Fan relay No.2 control circuit malfunction | OFF | 1 | Other | C, O, R | × | (See01-02-152 DTC P0480[L3 WITH TC].) |
| P0500 | Vehicle speed sensor (VSS) circuit malfunction | ON | 2 | CCM | C | × | (See01-02-158 DTC P0500[L3 WITH TC].) |
| P0505 | Idle control system malfunction | OFF | – | – | R | – | (See01-02-159 DTC P0505[L3 WITH TC].) |
| P0506 | Idle control system RPM lower than expected | ON | 2 | CCM | C | × | (See01-02-160 DTC P0506[L3 WITH TC].) |
| P0507 | Idle control system RPM higher than expected | ON | 2 | CCM | C | × | (See01-02-162 DTC P0507[L3 WITH TC].) |
| P050A | Cold start idle air control system performance | ON | 2 | CCM | C, R | × | (See01-02-155 DTC P050A[L3 WITH TC].) |
| P050B | Cold start ignition timing performance | ON | 2 | CCM | C, R | × | (See01-02-157 DTC P050B[L3 WITH TC].) |
| P0550 | PSP switch circuit malfunction | ON | 2 | CCM | C | × | (See01-02-164 DTC P0550[L3 WITH TC].) |
| P0564 | Cruise control switch circuit malfunction | OFF | 1 | Other | C | × | (See01-02-166 DTC P0564[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0571 | Brake switch circuit malfunction | OFF | 1 | Other | C | × | (See01-02-168 DTC P0571[L3 WITH TC].) |
| P0601 | Internal control module memory check sum error | ON | 1 | CCM | C, O, R | × | (See01-02-170 DTC P0601[L3 WITH TC].) |
| P0602 | PCM programming error | ON | 1 | CCM | C, O, R | × | (See01-02-170 DTC P0602[L3 WITH TC].) |
| P0604 | PCM RAM error | ON | 1 | CCM | C, O, R | × | (See01-02-171 DTC P0604[L3 WITH TC].) |
| P0606 | PCM processor | ON | 1 | CCM | C, O, R | × | (See01-02-172 DTC P0606[L3 WITH TC].) |
| P0607 | Control module performance | OFF | 1 | Other | C, O, R | × | (See01-02-172 DTC P0607[L3 WITH TC].) |
| P0610 | Control module vehicle options error | ON | 1 | CCM | C, O, R | × | (See01-02-173 DTC P0610[L3 WITH TC].) |
| P0638 | Throttle actuator control range/ performance | ON | 1 | CCM | C | × | (See01-02-174 DTC P0638[L3 WITH TC].) |
| P0703 | Brake switch No.1 circuit malfunction | ON | 2 | CCM | C | × | (See01-02-174 DTC P0703[L3 WITH TC].) |
| P1260 | Immobilizer system problem | OFF | – | CCM | C, O | × | (See01-02-177 DTC P1260[L3 WITH TC].) |
| P2004 | Variable swirl control system shutter valve stuck open | ON | 2 | CCM | C, R | × | (See01-02-178 DTC P2004[L3 WITH TC].) |
| P2006 | Variable swirl control system shutter valve stuck closed | ON | 2 | CCM | C, R | × | (See01-02-181 DTC P2006[L3 WITH TC].) |
| P2009 | Variable swirl solenoid valve control circuit low | ON | 2 | CCM | C, O, R | × | (See01-02-184 DTC P2009[L3 WITH TC].) |
| P2010 | Variable swirl solenoid valve control circuit high | ON | 2 | CCM | C, O, R | × | (See01-02-186 DTC P2010[L3 WITH TC].) |
| P2088 | OCV actuator circuit low | ON | 1 | CCM | C, O, R | × | (See01-02-188 DTC P2088[L3 WITH TC].) |
| P2089 | OCV actuator circuit high | ON | 1 | CCM | C, O, R | × | (See01-02-190 DTC P2089[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P2096 | Target A/F feedback system too lean | ON | 2 | Fuel system | C | × | (See01-02-191 DTC P2096[L3 WITH TC].) |
| P2097 | Target A/F feedback system too rich | ON | 2 | Fuel system | C | × | (See01-02-194 DTC P2097[L3 WITH TC].) |
| P2100 | Throttle actuator circuit open | ON | 1 | CCM | C, O, R | × | (See01-02-197 DTC P2100[L3 WITH TC].) |
| P2101 | Throttle actuator circuit range/ performance | ON | 1 | CCM | C, R | × | (See01-02-199 DTC P2101[L3 WITH TC].) |
| P2102 | Throttle actuator circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-202 DTC P2102[L3 WITH TC].) |
| P2103 | Throttle actuator circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-204 DTC P2103[L3 WITH TC].) |
| P2107 | Throttle actuator control module processor problem | ON | 1 | CCM | C, R | × | (See01-02-205 DTC P2107[L3 WITH TC].) |
| P2108 | Throttle actuator control module performance problem | ON | 1 | CCM | C, R | × | (See01-02-206 DTC P2108[L3 WITH TC].) |
| P2119 | Throttle actuator control throttle body range/performance | ON | 1 | CCM | C, R | × | (See01-02-207 DTC P2119[L3 WITH TC].) |
| P2122 | Accelerator pedal position (APP) sensor No.1 circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-208 DTC P2122[L3 WITH TC].) |
| P2123 | Accelerator pedal position (APP) sensor No.1 circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-210 DTC P2123[L3 WITH TC].) |
| P2127 | Accelerator pedal position (APP) sensor No.2 circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-212 DTC P2127[L3 WITH TC].) |
| P2128 | Accelerator pedal position (APP) sensor No.2 circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-214 DTC P2128[L3 WITH TC].) |
| P2135 | Throttle position sensor No.1/No.2 voltage correlation problem | ON | 1 | CCM | C, O, R | × | (See01-02-216 DTC P2135[L3 WITH TC].) |
| P2138 | Accelerator pedal position (APP) sensor No.1/No.2 voltage correlation problem | ON | 1 | CCM | C, O, R | × | (See01-02-217 DTC P2138[L3 WITH TC].) |
| P2177 | Fuel system too lean at off idle | ON | 2 | Fuel system | C, R | × | (See01-02-218 DTC P2177[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P2178 | Fuel system too rich at off idle | ON | 2 | Fuel system | C, R | × | (See01-02-220 DTC P2178[L3 WITH TC].) |
| P2187 | Fuel system too lean at idle | ON | 2 | Fuel system | C, R | × | (See01-02-223 DTC P2187[L3 WITH TC].) |
| P2188 | Fuel system too rich at idle | ON | 2 | Fuel system | C, R | × | (See01-02-226 DTC P2188[L3 WITH TC].) |
| P2195 | Front HO2S signal stuck lean | ON | 2 | HO2S | C | × | (See01-02-229 DTC P2195[L3 WITH TC].) |
| P2196 | Front HO2S signal stuck rich | ON | 2 | HO2S | C | × | (See01-02-231 DTC P2196[L3 WITH TC].) |
| P2228 | BARO sensor circuit low input | ON | 1 | CCM | C, O, R | × | (See01-02-233 DTC P2228[L3 WITH TC].) |
| P2229 | BARO sensor circuit high input | ON | 1 | CCM | C, O, R | × | (See01-02-234 DTC P2229[L3 WITH TC].) |
| P2237 | Front HO2S positive current control circuit open | ON | 2 | HO2S | C, O, R | × | (See01-02-235 DTC P2237[L3 WITH TC].) |
| P2245 | Front HO2S sensor reference voltage circuit low input | ON | 2 | HO2S | C, O, R | × | (See01-02-237 DTC P2245[L3 WITH TC].) |
| P2246 | Front HO2S sensor reference voltage circuit high input | ON | 2 | HO2S | C, O, R | × | (See01-02-239 DTC P2246[L3 WITH TC].) |
| P2251 | Front HO2S negative current control circuit open | ON | 2 | HO2S | C, O, R | × | (See01-02-241 DTC P2251[L3 WITH TC].) |
| P2401 | EVAP system leak detection pump motor circuit low | ON | 2 | CCM | C, R | × | (See01-02-243 DTC P2401[L3 WITH TC].) |
| P2402 | EVAP system leak detection pump motor circuit high | ON | 2 | CCM | C, R | × | (See01-02-246 DTC P2402[L3 WITH TC].) |
| P2404 | EVAP system leak detection pump sensor circuit malfunction | ON | 2 | CCM | C, R | × | (See01-02-248 DTC P2404[L3 WITH TC].) |
| P2405 | EVAP system leak detection pump sensor circuit low input | ON | 2 | CCM | C, R | × | (See01-02-249 DTC P2405[L3 WITH TC].) |
| P2407 | EVAP system leak detection pump sensor circuit intermittent | ON | 2 | CCM | C, R | × | (See01-02-250 DTC P2407[L3 WITH TC].) |

| DTC No. | Condition | MIL | DC | Monitor item | Self-test type*2 | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P2502 | Generator terminal B circuit open | OFF | 1 | – | C, R | × | (See01-02-251 DTC P2502[L3 WITH TC].) |
| P2503 | Generator output voltage signal no electricity | OFF | 1 | Other | C, R | × | (See01-02-252 DTC P2503[L3 WITH TC].) |
| P2504 | Battery overcharge | OFF | 1 | Other | C, R | × | (See01-02-254 DTC P2504[L3 WITH TC].) |
| P2507 | PCM +BB (back-up battery) voltage low | ON | 1 | CCM | C, O, R | × | (See01-02-256 DTC P2507[L3 WITH TC].) |
| P2610 | PCM internal engine off timer performance | ON | 2 | CCM | C | × | (See01-02-258 DTC P2610[L3 WITH TC].) |
| U0073 | Control module communication Bus off | (See09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0101 | CAN system communication error | (See09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0121 | Communication error to ABS HU/CM | (See09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0155 | Communication error to instrument cluster | (See09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |

*1 : California emission regulation applicable model
*2 : C; CMDTC self-test, O; KOEO self-test, R; KOER self-test



### DTC B1342[L3 WITH TC]

id010239815700

| DTC B1342 | PCM malfunction |
|---|---|
| DETECTION CONDITION | • Malfunction in the PCM internal circuit. |
| POSSIBLE CAUSE | • PCM internal malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY CURRENT STATUS OF MALFUNCTION**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 2 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0011[L3 WITH TC]

id010239801600

| DTC P0011 | CMP Timing over-advanced |
|---|---|
| DETECTION CONDITION | • Actual valve timing is over-advanced by **17 °** **(when the following conditions are met) from the target valve timing when the OCV is controlled at the maximum valve timing retard condition.**<br>**MONITORING CONDITION**<br>— Engine speed is **below 4,000 rpm.**<br>— Engine coolant temperature is **above 70— 110 °C {158— 230 °F}.**<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • OCV malfunction<br>• Spool valve in the OCV is stuck in the advance position.<br>• Variable valve timing actuator is stuck in the advance position.<br>• Loose timing chain or improper valve timing due to timing chain slippage<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TIMING CHAIN INSTALLATION**<br>• Stop the engine.<br>• Remove the timing chain cover.<br>• Is the camshaft timing mark at the correct point?<br>(See 01-10-10 TIMING CHAIN REMOVAL/ INSTALLATION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Reinstall the timing chain, then go to Step 7. |
| 4 | **INSPECT OCV FOR MALFUNCTION**<br>• Start the engine.<br>• Increase the engine speed.<br>• Stop the engine.<br>• Remove the OCV.<br>• Inspect the position of the spool valve in the OCV.<br>• Is the spool valve located at the valve retard position? | Yes | Go to the next step. |
| | | No | Replace the OCV, then go to Step 7. |
| 5 | **INSPECT STOPPER PIN MECHANISM**<br>• Remove the timing chain.<br>• Inspect the stopper pin.<br>(See 01-10-27 VARIABLE VALVE TIMING ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is the stopper pin mechanism normal? | Yes | Go to the next step. |
| | | No | Replace the variable valve timing actuator, then go to Step 7. |
| 6 | **INSPECT ROTOR POSITION**<br>• Remove the variable valve timing actuator.<br>• Is the rotor position at the maximum valve timing retard? | Yes | **VARIABLE VALVE TIMING MECHANISM IS NORMAL**<br>**Note**<br>• This DTC is detected as an intermittent concern.<br>• The intermittent concern might be removed using the cleaning mode of the variable valve timing control function.<br>Go to the next step. |
| | | No | Replace the variable valve timing actuator, go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0011 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



### DTC P0012[L3 WITH TC]

id010239801700

| DTC P0012 | CMP Timing over-retarded |
|---|---|
| DETECTION CONDITION | • Actual valve timing is over-retarded by **5 ° (when the following conditions are met) from the target valve timing for 5 s when the OCV system control is within the feed-back range.**<br>**MONITORING CONDITION**<br>— Engine speed is **below 4,000 rpm.**<br>— Engine coolant temperature is **above 70— 110 °C {158— 230 °F}.**<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • OCV malfunction<br>• Low engine oil pressure<br>• Spool valve in OCV is stuck in the retard position.<br>• Variable valve timing actuator is stuck in the retard position.<br>• Following oil runners are clogged or have leakage.<br>**Oil runners**<br>• Between oil pressure switch and OCV<br>• Between OCV and variable valve timing actuator<br>• In variable valve timing actuator<br>• Loose timing chain or improper valve timing due to timing chain slippage<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Is DTC P2088 or P2089 present? | Yes | Go to the appropriate DTC troubleshooting procedure.<br>(See 01-02-188 DTC P2088[L3 WITH TC] or 01-02-190 DTC P2089[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY ENGINE OIL PRESSURE**<br>• Start the engine.<br>• Does the oil pressure warning light illuminate? | Yes | Inspect engine oil pressure.<br>(See 01-11-2 OIL PRESSURE INSPECTION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY TIMING CHAIN INSTALLATION**<br>• Stop the engine.<br>• Remove the timing chain cover.<br>• Is the camshaft timing mark at the correct point?<br>(See 01-10-10 TIMING CHAIN REMOVAL/ INSTALLATION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Reinstall the timing chain, then go to Step 8. |
| 6 | **INSPECT OCV FOR MALFUNCTION**<br>• Stop the engine.<br>• Remove the OCV.<br>• Inspect the position of the spool valve in the OCV.<br>• Is the spool valve located at the valve retard position? | Yes | **VARIABLE VALVE TIMING MECHANISM IS NORMAL**<br><br>**Note**<br>• This DTC is detected as an intermittent concern.<br>• The intermittent concern might be removed using the cleaning mode of the variable valve timing control function.<br><br>Go to the next step. |
| | | No | Replace the OCV, then go to Step 8. |
| 7 | **INSPECT ENGINE OIL RUNNER**<br>• Inspect the following engine oil runners for clogging or leakage.<br>— Between the oil pressure switch and the OCV<br>— Between the OCV and the variable valve timing actuator<br>— In the variable valve timing actuator<br>• Is there any clogging or leakage? | Yes | Repair or replace the suspected runner, then go to the next step. |
| | | No | **VARIABLE VALVE TIMING MECHANISM IS NORMAL**<br><br>**Note**<br>• This DTC is detected as an intermittent concern.<br>• The intermittent concern might be removed using the cleaning mode of the variable valve timing control function.<br><br>Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0012 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0016[L3 WITH TC]

id010239801800

| DTC P0016 | CKP-CMP correlation |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input pulses from the CKP sensor and CMP sensor. If the input pulse pick-up timing do not match each other, the PCM determines that the camshaft position does not coincide with the crankshaft position.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Poor connection of connector<br>• CMP sensor malfunction<br>• CKP sensor malfunction<br>• Damaged or scratched CMP sensor pulse wheel<br>• Damaged or scratched CKP sensor pulse wheel<br>• Foreign material on CMP sensor<br>• Foreign material on CKP sensor<br>• Improper valve timing |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT CMP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the CMP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 13. |
| | | No | Go to the next step. |
| 4 | **INSPECT CMP SENSOR FOR FOREIGN MATERIAL**<br>• Remove the CMP sensor.<br>• Inspect the CMP sensor for foreign material.<br>• Is there any foreign material on the CMP sensor? | Yes | Remove foreign material from the CMP sensor, then go to Step 13. |
| | | No | Go to the next step. |
| 5 | **INSPECT CMP SENSOR PULSE WHEEL**<br>• Visually inspect the CMP sensor pulse wheel.<br>• Is there any damage or scratching to the CMP sensor pulse wheel? | Yes | Replace the camshaft, then go to Step 13. (See01-10-20 CYLINDER HEAD GASKET REPLACEMENT[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT CMP SENSOR**<br>• Inspect the CMP sensor. (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the CMP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the CMP, then go to Step 13. |
| 7 | **INSPECT CKP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the CKP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 13. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **INSPECT CKP SENSOR FOR FOREIGN MATERIAL**<br>• Remove the CKP sensor.<br>• Inspect the CKP sensor for foreign material.<br>• Is there any foreign material on the CKP sensor? | Yes | Remove foreign material from the CKP sensor, then go to Step 13. |
| | | No | Go to the next step. |
| 9 | **INSPECT CKP SENSOR PULSE WHEEL**<br>• Visually inspect the CKP sensor pulse wheel.<br>• Is there any damage or scratching to the CKP sensor pulse wheel? | Yes | Replace the CKP sensor pulse wheel, then go to Step 13. (See01-10-10 TIMING CHAIN REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **INSPECT CKP SENSOR**<br>• Inspect the CKP sensor. (See01-40-43 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the CKP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the CKP sensor, then go to Step 13. (See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| 11 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 13. |
| | | No | Go to the next step. |
| 12 | **INSPECT VALVE TIMING**<br>• Inspect valve timing. (See01-10-10 TIMING CHAIN REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Is valve timing normal? | Yes | Go to the next step. |
| | | No | Adjust the valve timing properly, then go to the next step. (See01-10-10 TIMING CHAIN REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 13 | **VERIFY TROUBLESHOOTING OF DTC P0016 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 14 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

**DTC P0030[L3 WITH TC]**

id010239801900

| DTC P0030 | Front HO2S heater control circuit problem |
|---|---|
| DETECTION CONDITION | • OBD system monitors the output signal voltage from oxygen sensor which is in proportion to the element impedance of oxygen sensor. If the output signal voltage is not between **0.75 V** and **1.5 V** after specified time from engine start, heater performance is considered failed.<br>**Monitoring condition**<br>• **74 s** elapsed from engine start<br>• Battery voltage:**10— 18 V**<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S heater).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |

| DTC P0030 | Front HO2S heater control circuit problem |
|---|---|
| POSSIBLE CAUSE | • Front HO2S heater malfunction<br>• Connector or terminal malfunction<br>• Open circuit in wiring harness between front HO2S heater terminal 2D and PCM terminal 2C<br>• Short to ground in the wiring harness between front HO2S heater terminal 2D and PCM terminal 2C<br>• Short to power supply in the wiring harness between front HO2S heater terminal 2D and PCM terminal 2C<br>• Open circuit in the wiring harness between front HO2S heater terminal 1B and PCM terminal 2AC<br>• PCM malfunction |



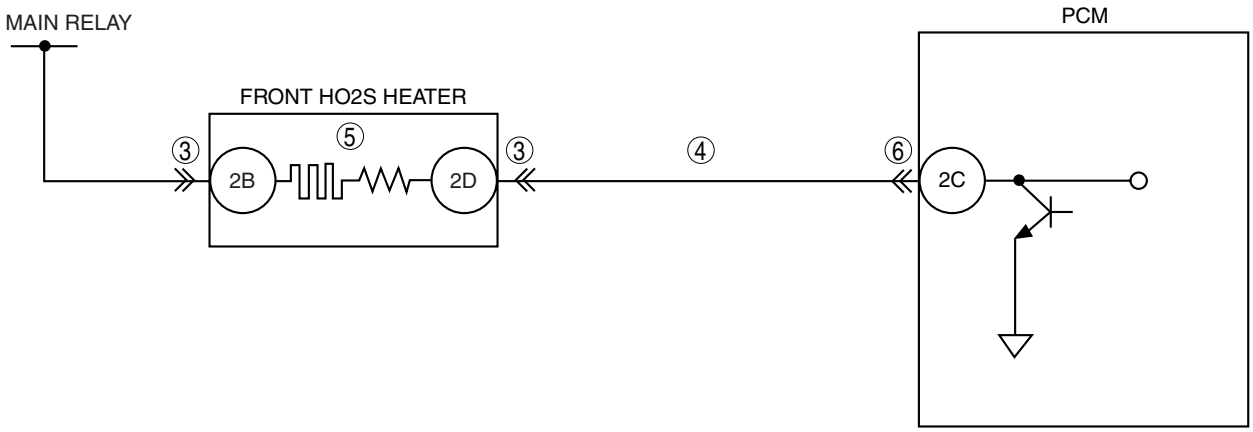
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S heater related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCs**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs using the M-MDS.<br>• Is DTC P0031 or P0032 also present? | Yes | Go to appropriate DTC troubleshooting procedure. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0030 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting for DTC on FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT FRONT HO2S HEATER**<br>• Inspect the front HO2S heater. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the front HO2S, then go to Step 8. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0030 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

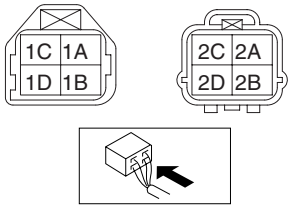
## DTC P0031[L3 WITH TC]

id010239802000

| DTC P0031 | Front HO2S heater circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S heater output voltage. If the PCM turns the front HO2S heater off or on but the front HO2S heater circuit voltage remains low the PCM determines that the front HO2S heater circuit has a malfunction.<br><br>**Note**<br>• The front HO2S heater is controlled by a duty signal.<br><br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S heater).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S heater malfunction<br>• Connector or terminal malfunction<br>• Open circuit in the wiring harness between main relay and front HO2S terminal 2B<br>• Short to ground in the wiring harness between main relay and front HO2S terminal 2B<br>• Open circuit in the wiring harness between front HO2S terminal 2D and PCM terminal 2C<br>• Short to ground in the wiring harness between front HO2S terminal 2D and PCM terminal 2C<br>• PCM malfunction |

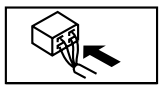



FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

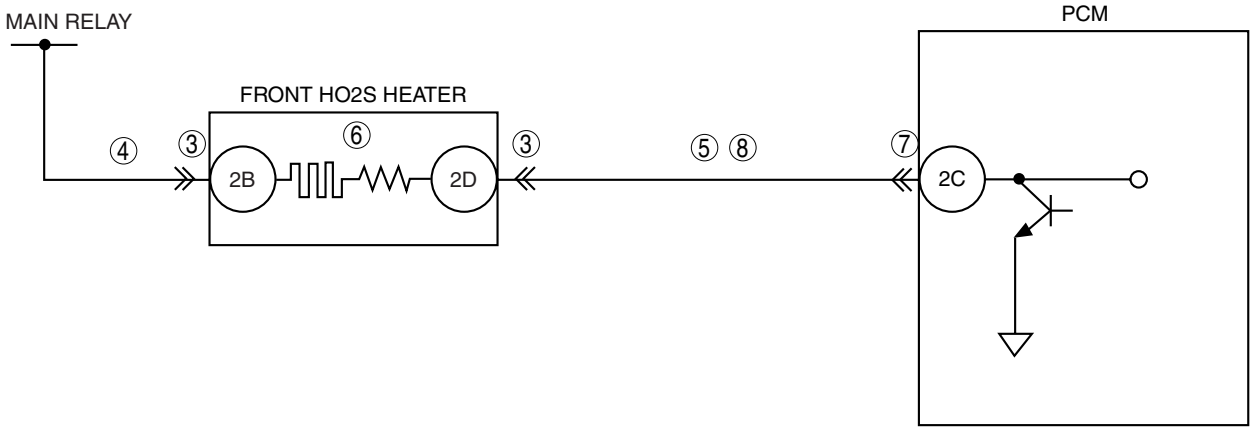
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S heater related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **INSPECT FRONT HO2S HEATER POWER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between front HO2S terminal 2B (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit or short to ground, then go to Step 9. |
| 5 | **INSPECT FRONT HO2S HEATER CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between front HO2S terminal 2D (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT FRONT HO2S HEATER**<br>• Inspect the front HO2S heater. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the front HO2S, then go to Step 9. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT FRONT HO2S HEATER CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between front HO2S terminal 2D (wiring harness-side) and PCM terminal 2C (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0031 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

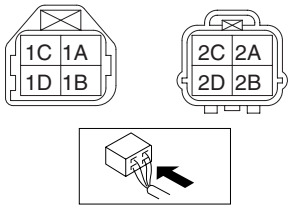
## DTC P0032[L3 WITH TC]

id010239802100

| DTC P0032 | Front HO2S heater circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S heater output voltage. If the PCM turns the front HO2S heater on or off but the front HO2S heater circuit voltage remains high the PCM determines that the front HO2S heater circuit has a malfunction.<br><br>**Note**<br>• The front HO2S heater is controlled by a duty signal.<br><br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S heater).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S heater malfunction<br>• Connector or terminal malfunction<br>• Short to power supply in the wiring harness between front HO2S terminal 2D and PCM terminal 2C<br>• PCM malfunction |

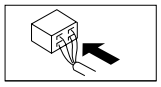



FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



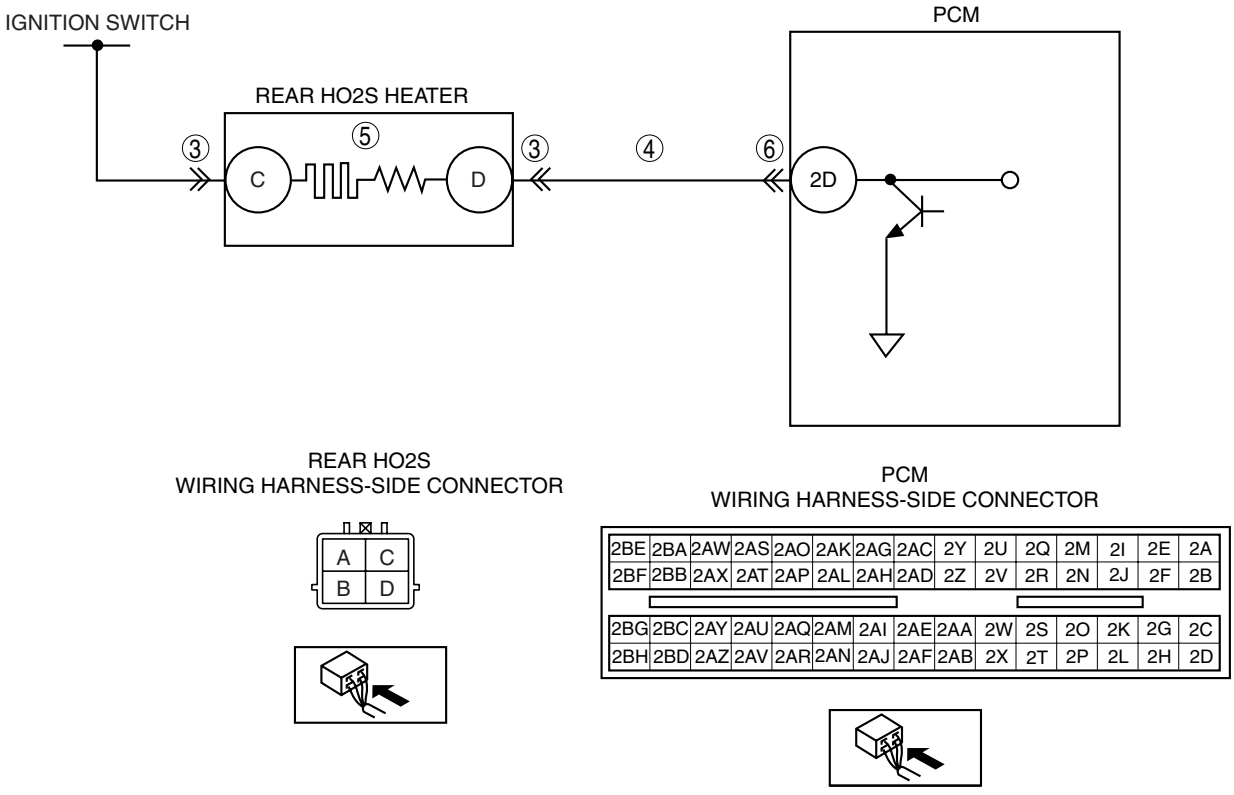
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S heater related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT FRONT HO2S HEATER CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between front HO2S terminal 2D (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT FRONT HO2S HEATER**<br>• Inspect the front HO2S heater. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the front HO2S, then go to Step 7. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0032 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P0037[L3 WITH TC]

id010239802200

| DTC P0037 | Rear HO2S heater circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the rear HO2S heater output voltage. If the PCM turns the rear HO2S heater on or off but the rear HO2S heater circuit voltage remains low the PCM determines that the rear HO2S heater circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S heater).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Rear HO2S heater malfunction<br>• Connector or terminal malfunction<br>• Open circuit in the wiring harness between ignition switch and rear HO2S terminal C<br>• Short to ground in the wiring harness between ignition switch and rear HO2S terminal C<br>• Open circuit in the wiring harness between rear HO2S terminal D and PCM terminal 2D<br>• Short to ground in the wiring harness between rear HO2S terminal D and PCM terminal 2D<br>• PCM malfunction |




### Diagnostic procedure

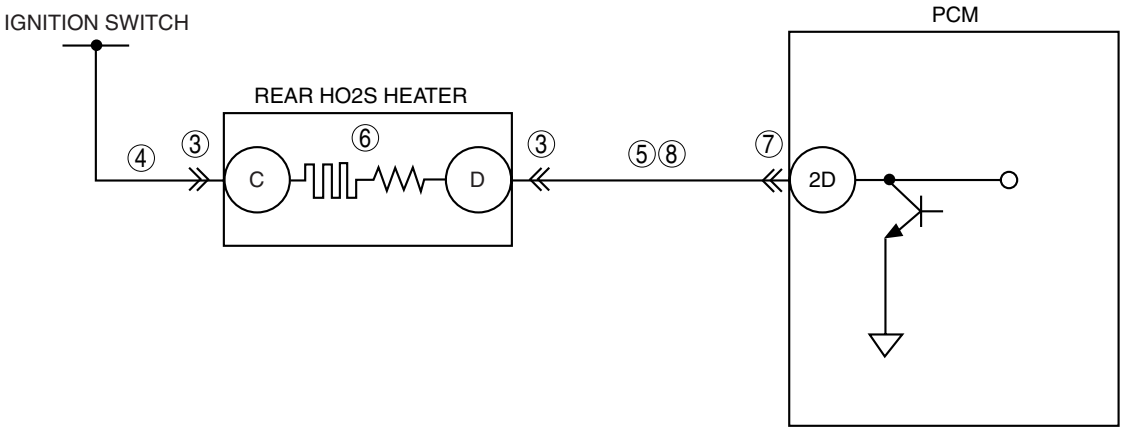
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S heater related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT REAR HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the rear HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **INSPECT REAR HO2S HEATER POWER CIRCUIT FOR OPEN CIRCUIT OR SHORT TO GROUND**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between rear HO2S terminal C (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit or short to ground, then go to Step 9. |
| 5 | **INSPECT REAR HO2S HEATER CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between rear HO2S terminal D (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT REAR HO2S HEATER**<br>• Inspect the rear HO2S heater. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the rear HO2S, then go to Step 9. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT REAR HO2S HEATER CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between rear HO2S terminal D (wiring harness-side) and PCM terminal 2D (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0037 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

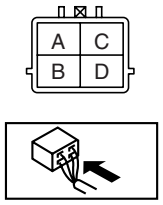
## DTC P0038[L3 WITH TC]

id010239802300

| DTC P0038 | Rear HO2S heater circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the rear HO2S heater output voltage. If the PCM turns the rear HO2S heater off but the rear HO2S heater circuit voltage remains high the PCM determines that the rear HO2S heater circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S heater).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Rear HO2S heater malfunction<br>• Connector or terminal malfunction<br>• Short to power supply in the wiring harness between rear HO2S terminal D and PCM terminal 2D<br>• PCM malfunction |




REAR HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S heater related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT REAR HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the rear HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT REAR HO2S HEATER CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between rear HO2S terminal D (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT REAR HO2S HEATER**<br>• Inspect the rear HO2S heater. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the rear HO2S, then go to Step 7. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0038 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P0069[L3 WITH TC]

id010239802400

| DTC P0069 | Manifold absolute pressure/atmospheric pressure correlation |
|---|---|
| DETECTION CONDITION | • PCM monitors differences between intake manifold vacuum and atmospheric pressure. If the difference is **below –12 kPa {–90 mmHg, –3.5 inHg}** or **above 12 kPa {90 mmHg, 3.5 inHg}** when the following conditions are met, the PCM determines that there is a MAP sensor performance problem.<br>**MONITORING CONDITION**<br>— **12— 15 s** from when ignition switch is turned off.<br>— Intake air temperature is **above -10°C {14°F}.**<br>— Engine coolant temperature is **above 70°C {158°F}.**<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • MAP sensor malfunction or substandard performance<br>• BARO sensor malfunction or substandard performance |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY STORED DTC**<br>• Turn the ignition switch to off then start the engine.<br>• Have DTC P0107, P0108, P2228 or P2229 been stored? | Yes | Inspect and repair DTC P0107, P0108, P2228 or P2229. |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0069 on the FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for the DTC on the FREEZE FRAME DATA. |
| 5 | **INSPECT MAP SENSOR STUCK OPEN OR CLOSED**<br>• Inspect MAP sensor. (See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the MAP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the MAP sensor, then go to step 7. (See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/BOOST AIR TEMPERATURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| 6 | **INSPECT BARO SENSOR**<br>• Inspect the BARO sensor. (See01-40-48 BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the BARO sensor normal? | Yes | Go to the next step. |
| | | No | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0069 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P0089[L3 WITH TC]

id010239802500

| DTC P0089 | Fuel pressure regulator performance |
|---|---|
| DETECTION CONDITION | • If the fuel pressure average value measured by the PCM exceeds the specification when the camshaft is rotating at a specified rate, the PCM determines that there is a fuel pressure regulator performance problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Spill valve control solenoid valve malfunction<br>• Connector or terminal malfunction<br>• PCM malfunction |



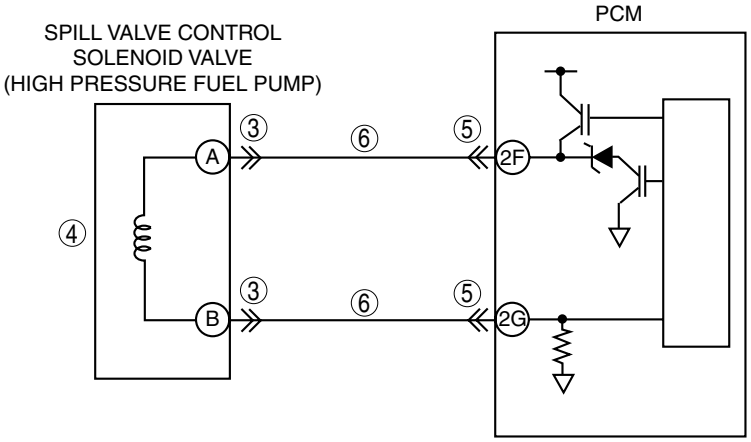
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT HIGH PRESSURE FUEL PUMP CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the high pressure fuel pump connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminals, then go to Step 6. |
| | | No | Go to the next step. |
| 4 | **INSPECT SPILL VALVE CONTROL SOLENOID VALVE**<br>• Inspect the spill valve control solenoid valve. (See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the high pressure fuel pump, then go to Step 6. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion.)<br>• Is there any malfunction? | Yes | Repair the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0089 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

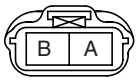
## DTC P0091[L3 WITH TC]

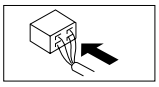
id010239802600

| DTC P0091 | Fuel pressure regulator control circuit low |
|---|---|
| DETECTION CONDITION | • When the PCM turns the spill valve control solenoid valve off but the spill valve control solenoid valve control circuit voltage is low, the PCM determines that the spill valve control solenoid valve control circuit has malfunction.<br>**MONITORING CONDITIONS**<br>— The following conditions are met:<br>• Engine speed is **3,000 rpm or less**.<br>• Battery voltage is **10 V or more.**<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Spill valve control solenoid valve malfunction<br>• Open circuit in the wiring harness between high pressure fuel pump terminal A and PCM terminal 2F<br>• Open circuit in the wiring harness between high pressure fuel pump terminal B and PCM terminal 2G<br>• Short to ground in the wiring harness between high pressure fuel pump terminal A and PCM terminal 2F<br>• Short to ground in the wiring harness between high pressure fuel pump terminal B and PCM terminal 2G<br>• Connector or terminal malfunction<br>• PCM malfunction |



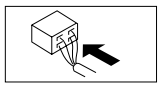

HIGH PRESSURE FUEL PUMP
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

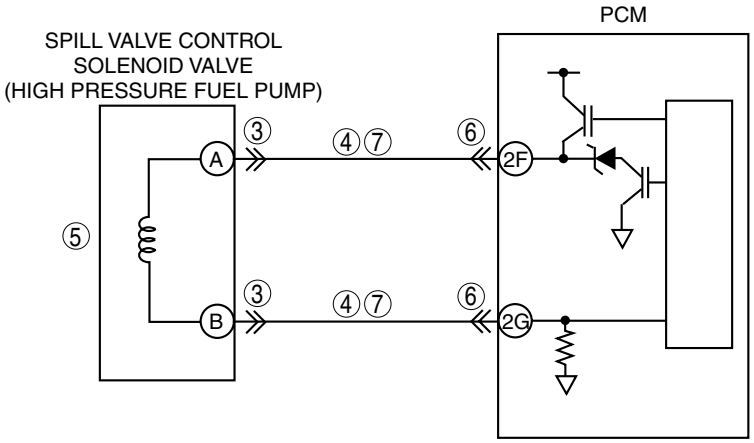
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related service repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT HIGH PRESSURE FUEL PUMP CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the high pressure fuel pump connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **INSPECT SPILL VALVE CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— High pressure fuel pump terminal A (wiring harness-side) and body ground<br>— High pressure fuel pump terminal B (wiring harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT SPILL VALVE CONTROL SOLENOID VALVE**<br>• Inspect the spill valve control solenoid valve. (See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>• Is there any malfunction. | Yes | Replace the high pressure fuel pump, then go to Step 8. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT SPILL VALVE CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— High pressure fuel pump terminal A (wiring harness-side) and PCM terminal 2F (wiring harness-side)<br>— High pressure fuel pump terminal B (wiring harness-side) and PCM terminal 2G (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0091 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

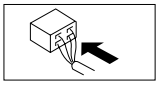
## DTC P0092[L3 WITH TC]

id010239802700

| DTC P0092 | Fuel pressure regulator control circuit high |
|---|---|
| DETECTION CONDITION | • When the PCM turns the spill valve control solenoid valve on but the spill valve control solenoid valve circuit voltage is high, the PCM determines that the spill valve control solenoid valve control circuit has malfunction.<br>**MONITORING CONDITIONS**<br>— The following conditions are met:<br>• Engine speed is **3,000 rpm or less**.<br>• Battery voltage is **10 V or more.**<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Spill valve control solenoid valve malfunction<br>• Connector or terminal malfunction<br>• Short to power supply in the wiring harness between high pressure fuel pump terminal B and PCM terminal 2G<br>• PCM malfunction |

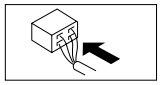



HIGH PRESSURE FUEL PUMP
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



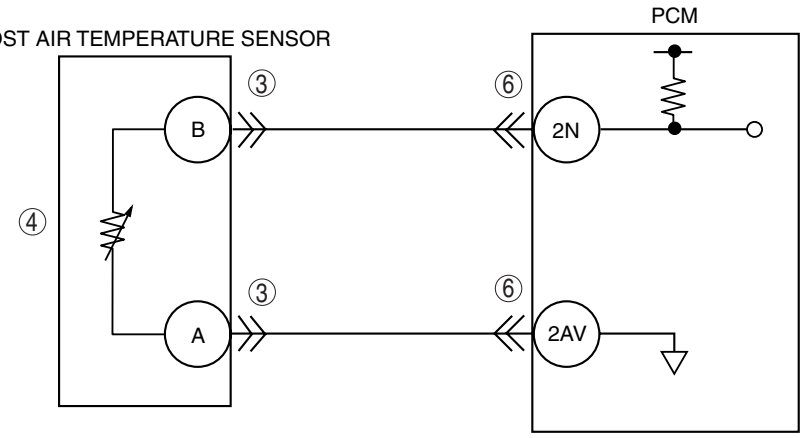
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related service repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT HIGH PRESSURE FUEL PUMP CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the high pressure fuel pump connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT SPILL VALVE CONTROL SOLENOID VALVE**<br>• Inspect the spill valve control solenoid valve. (See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>• Is there any malfunction. | Yes | Replace the high pressure fuel pump, then go to Step 7. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT SPILL VALVE CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the following terminals:<br>— High pressure fuel pump terminal A (wiring harness-side) and body ground<br>— High pressure fuel pump terminal B (wiring harness-side) and body ground<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to the power supply, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0092 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

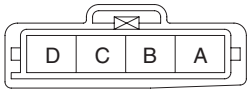
## DTC P0096[L3 WITH TC]

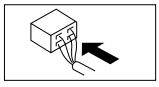
id010239802800

| DTC P0096 | Boost air temperature sensor circuit range/performance problem |
|---|---|
| DETECTION CONDITION | • If the intake air temperature is higher than the engine coolant temperature by **23 °C {41.4 °F}** for **1.2 s** with the ignition switch turn to the ON position*, the PCM determines that there is a boost air temperature sensor circuit range/performance problem.<br>*: Ignition switch on when **6 h or more** has passed since the ignition switch was turned off<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Boost air temperature sensor malfunction<br>• ECT sensor malfunction<br>• Connector or terminal malfunction<br>• PCM malfunction |



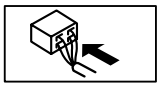

MAP/BOOST AIR TEMPERATURE SENSOR
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



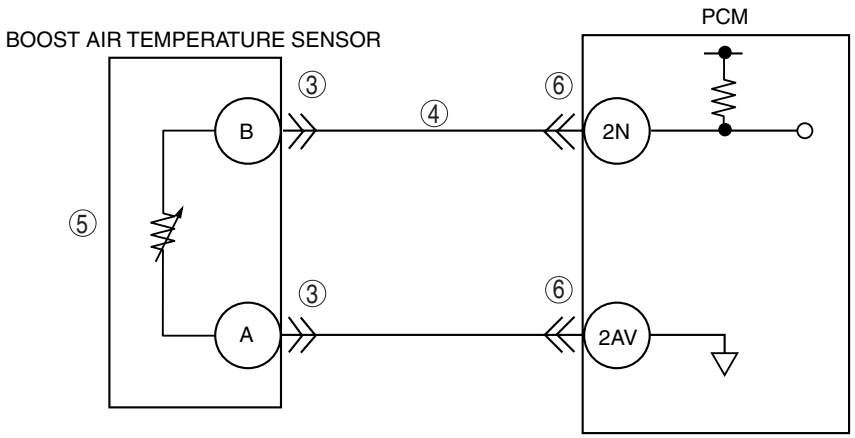
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT MAP/BOOST AIR TEMPERATURE SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAP/boost air temperature sensor connector.<br>• Inspect for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT BOOST AIR TEMPERATURE SENSOR**<br>• Inspect the boost air temperature sensor. (See01-40-31 BOOST AIR TEMPERATURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the MAP/boost air temperature sensor, then go to Step 7.<br>(See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/BOOST AIR TEMPERATURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT ECT SENSOR**<br>• Inspect the ECT sensor. (See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the ECT sensor, then go to Step 7.<br>(See01-40-24 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0096 COMPLETED**<br>• Make sure to connect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and run it under the FREEZE FRAME DATA condition.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

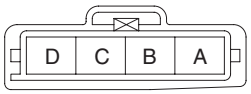
## DTC P0097[L3 WITH TC]

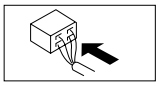
id010239802900

| DTC P0097 | Boost air temperature sensor circuit low |
|---|---|
| DETECTION CONDITION | • If the PCM detects that the boost air temperature sensor voltage is **0.1 V or less**, the PCM determines that the boost air temperature sensor circuit voltage is low.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Boost air temperature sensor malfunction<br>• Short to ground circuit between MAP/boost air temperature sensor terminal B and PCM terminal 2N<br>• Connector or terminal malfunction<br>• PCM malfunction |



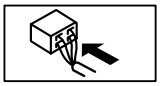

MAP/BOOST AIR TEMPERATURE SENSOR
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



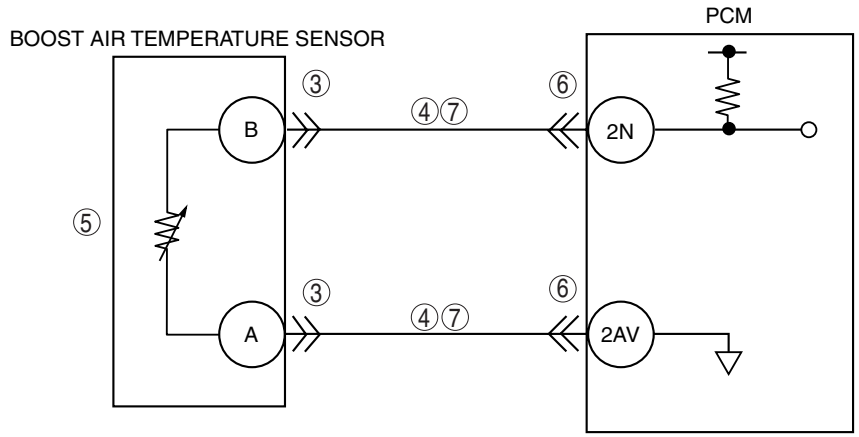
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT MAP/BOOST AIR TEMPERATURE SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAP/boost air temperature sensor connector.<br>• Inspect for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT BOOST AIR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the MAP/boost air temperature sensor terminal B (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT BOOST AIR TEMPERATURE SENSOR**<br>• Inspect the boost air temperature sensor. (See01-40-31 BOOST AIR TEMPERATURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is there malfunction? | Yes | Replace the MAP/boost air temperature sensor, then go to Step 7.<br>(See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/BOOST AIR TEMPERATURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0097 COMPLETED**<br>• Make sure to connect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

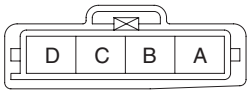
## DTC P0098[L3 WITH TC]

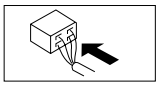
id010239803000

| DTC P0098 | Boost air temperature sensor circuit high |
|---|---|
| DETECTION CONDITION | • If the PCM detects that the boost air temperature sensor voltage is **4.96 V or more**, the PCM determines that the boost air temperature sensor circuit voltage is high.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Boost air temperature sensor malfunction<br>• Open circuit between MAP/boost air temperature sensor terminal A and PCM terminal 2AV<br>• Open circuit between MAP/boost air temperature sensor terminal B and PCM terminal 2N<br>• Short to the power circuit between MAP/boost air temperature sensor terminal A and PCM terminal 2AV<br>• Short to the power circuit between MAP/boost air temperature sensor terminal B and PCM terminal 2N<br>• Connector or terminal malfunction<br>• PCM malfunction |



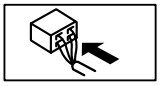

MAP/BOOST AIR TEMPERATURE SENSOR WIRING HARNESS-SIDE CONNECTOR



PCM WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT MAP/BOOST AIR TEMPERATURE SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAP/boost air temperature sensor connector.<br>• Inspect for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **INSPECT MAP/BOOST AIR TEMPERATURE SENSOR CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the following terminals:<br>— MAP/boost air temperature sensor terminal B (wiring harness-side) and body ground<br>— MAP/boost air temperature sensor terminal A (wiring harness-side) and body ground<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT BOOST AIR TEMPERATURE SENSOR**<br>• Inspect the boost air temperature sensor connector.<br>(See01-40-31 BOOST AIR TEMPERATURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the MAP/boost air temperature sensor, then go to Step 8.<br>(See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/BOOST AIR TEMPERATURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT MAP/BOOST AIR TEMPERATURE SENSOR CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Measure the voltage between the following terminals:<br>— MAP/boost air temperature sensor terminal B (wiring harness-side) and PCM terminal 2N (wiring harness-side)<br>— MAP/boost air temperature sensor terminal A (wiring harness-side) and PCM terminal 2AV (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0098 COMPLETED**<br>• Make sure to connect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P0101[L3 WITH TC]

id010239803100

| DTC P0101 | MAF circuit range/performance problem |
|---|---|
| DETECTION CONDITION | • PCM monitors the mass intake air flow amount when the engine is running.<br>— If the mass intake air amount is **above 71.8 l/s** for **6 s** and engine speed is **below 2,000 rpm** with the engine running, the PCM determines that detected mass intake air flow amount is too high.<br>— If the mass intake air flow amount is **below 3.0— 88.7 l/s** (The value depends on engine speed.) for **6 s** and the engine speed is **above 1,000 rpm** with engine running and the throttle opening angle is **above 50%**, the PCM determines that the detected mass intake air flow amount is too low.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • MAF sensor malfunction<br>• Electrical corrosion in MAF RETURN circuit<br>• Voltage drops in the ground circuit |

### Diagnostic procedure

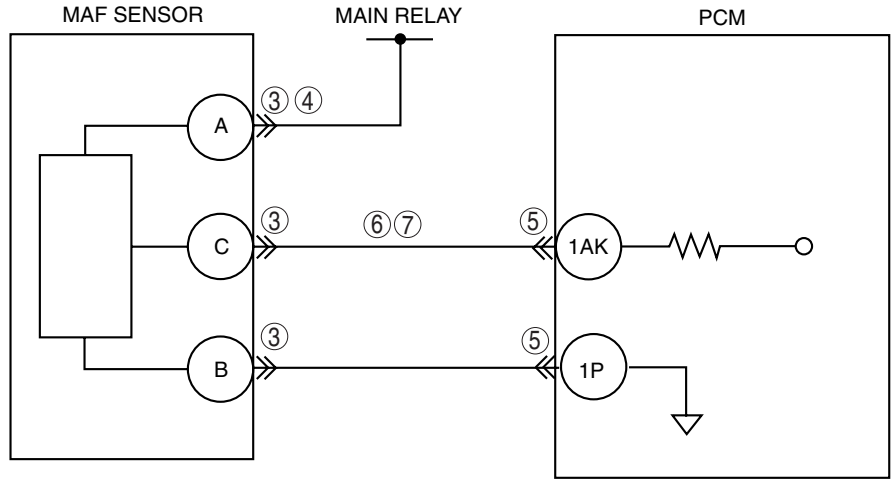
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY CURRENT INPUT SIGNAL STATUS IS CONCERN INTERMITTENT OR CONSTANT**<br>• Connect the M-MDS to DLC-2.<br>• Start the engine.<br>• Access the ECT, MAF, TP and RPM PIDs using the M-MDS.<br>• Warm-up the engine until the ECT PID is **above 70°C {158°F}.**<br>• Idle engine for**5 s or more.**<br>**Caution**<br>• **While driving, always operate the vehicle in a safe and lawful manner.**<br>• Drive the vehicle under the following two conditions:<br>**Condition 1**<br>— TP PID: **50— 87.5%**<br>— RPM PID: **above 1,000 rpm**<br>— 4th gear<br>**Condition 2**<br>— TP PID: **above 80%**<br>— RPM PID: **below 2,000 rpm**<br>— gear in<br>• Is the PENDING CODE for this DTC present? | Yes | Go to the next step. |
| | | No | Intermittent concern exists. Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC]) |
| 4 | **CHECK MAF SENSOR TERMINALS FOR ELECTRICAL CORROSION**<br>• Turn the ignition switch off.<br>• Disconnect the MAF sensor connector.<br>• Check for poor connection (damaged, pulled-out terminals, corrosion, etc.).<br>• Is any problem corrosion found? | Yes | Repair or the replace suspected terminal or MAF sensor, then go to Step 6. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Check for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair terminal, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0101 COMPLETED**<br>• Make sure to connect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Warm-up engine until ECT PID is **above 70°C {158°F}.**<br>• Idle engine for **5 s or more.**<br>**Caution**<br>• **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**<br>• Drive the vehicle under the following two conditions:<br>**Condition 1**<br>— TP PID:**50— 87.5%**<br>— RPM PID: **above 1,000 rpm**<br>— 4th gear<br>**Condition 2**<br>— TP PID: **above 80%**<br>— RPM PID: **below 2,000 rpm**<br>— gear in<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC])<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC]) |
| | | No | Troubleshooting completed. |

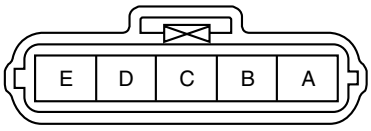
## DTC P0102[L3 WITH TC]

id010239803200

| DTC P0102 | MAF circuit low input |
|---|---|
| DETECTION CONDITION | • PCM monitors input voltage from the MAF sensor when engine is running. If the input voltage is **below 0.21 V**, the PCM determines that the MAF circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • MAF sensor malfunction<br>• Connector or terminal malfunction<br>• Short to ground in the wiring harness between MAF/IAT sensor terminal C and PCM terminal 1AK<br>• Open circuit in the wiring harness between MAF/IAT sensor terminal C and PCM terminal 1AK<br>• Open circuit in the wiring harness between main relay and MAF/IAT sensor terminal A |

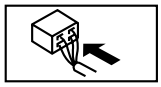


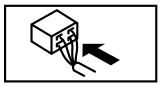

MAF/IAT SENSOR
HARNESS SIDE CONNECTOR




PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |





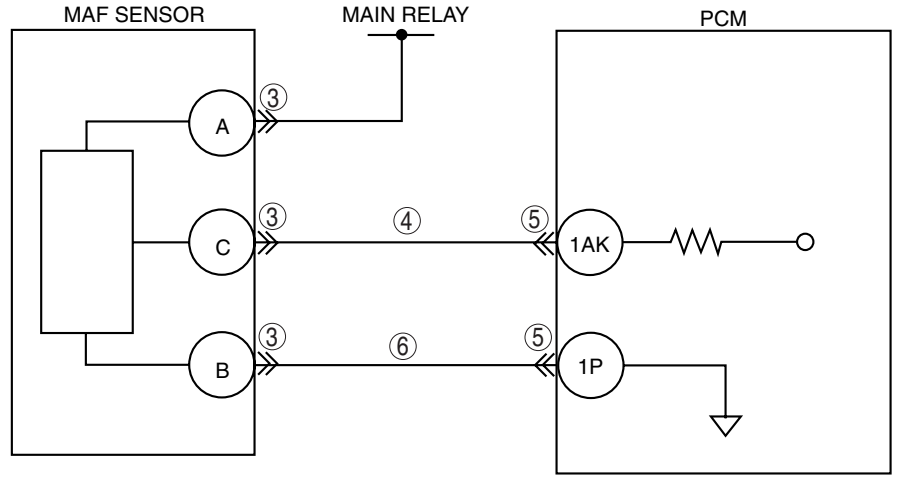
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAF/IAT sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace terminals, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **INSPECT POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Inspect voltage at MAF/IAT sensor terminal A (harness-side).<br>• Is voltage **B+**? | Yes | Go to the next step. |
| | | No | Inspect for an open circuit in the wiring harness between MAF/IAT sensor terminal A (harness-side) and the main relay.<br>Repair or replace the wiring harness, then go to Step 8. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT MAF SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Remove the PCM with the PCM connector connected.<br>• Inspect for continuity between MAF/IAT sensor terminal C (harness-side) and PCM terminal 1AK (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or the replace suspected wiring harness, then go to Step 8. |
| 7 | **INSPECT MAF SENSOR SIGNAL CIRCUIT FOR SHORT CIRCUIT**<br>• Inspect for continuity between the MAF/IAT sensor terminal C (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0102 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

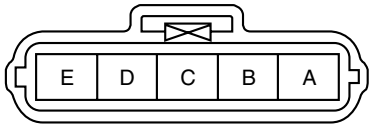
## DTC P0103[L3 WITH TC]

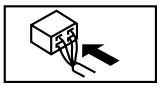
id010239803300

| DTC P0103 | MAF circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors input voltage from the MAF sensor when the engine is running. If the input voltage is **above 4.9 V**, the PCM determines that the MAF circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • MAF sensor malfunction<br>• Connector or terminal malfunction<br>• Short to power supply in the wiring harness between MAF/IAT sensor terminal C and PCM terminal 1AK<br>• Open circuit in the wiring harness between MAF/IAT sensor terminal B and PCM terminal 1P |



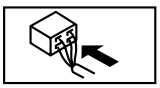

MAF/IAT SENSOR
HARNESS SIDE CONNECTOR



PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



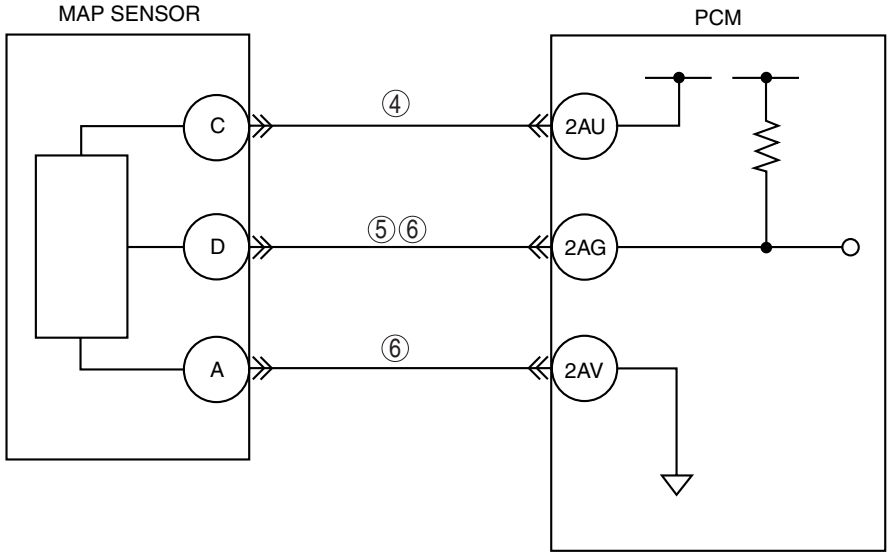
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT MAF SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAF/IAT sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace terminals, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT MAF SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure voltage between MAF/IAT sensor terminal C (harness-side) and body ground.<br>• Is voltage **0 V?** | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 7. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT MAF SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Remove the PCM with the PCM connector connected.<br>• Inspect for continuity between MAF/IAT sensor terminal B (harness-side) and PCM terminal 1P.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0103 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

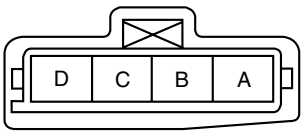
## DTC P0107[L3 WITH TC]

id010239803400

| DTC P0107 | MAP sensor circuit low input |
|---|---|
| DETECTION CONDITION | • PCM monitors input voltage from the MAP sensor when the intake air temperature is **above –10 °C {14 °F}**. If the input voltage is **below 0.10 V**, the PCM determines that the MAP sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • MAP sensor malfunction<br>• Connector or terminal malfunction<br>• Short to ground in the wiring harness between MAP sensor terminal D and PCM terminal 2AG<br>• Open circuit in the wiring harness between MAP sensor terminal C and PCM terminal 2AU<br>• MAP sensor signal circuit and MAP sensor ground circuit are shorted to each other.<br>• PCM malfunction |

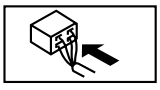


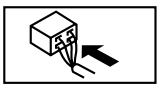

MAP SENSOR
HARNESS SIDE CONNECTOR




PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





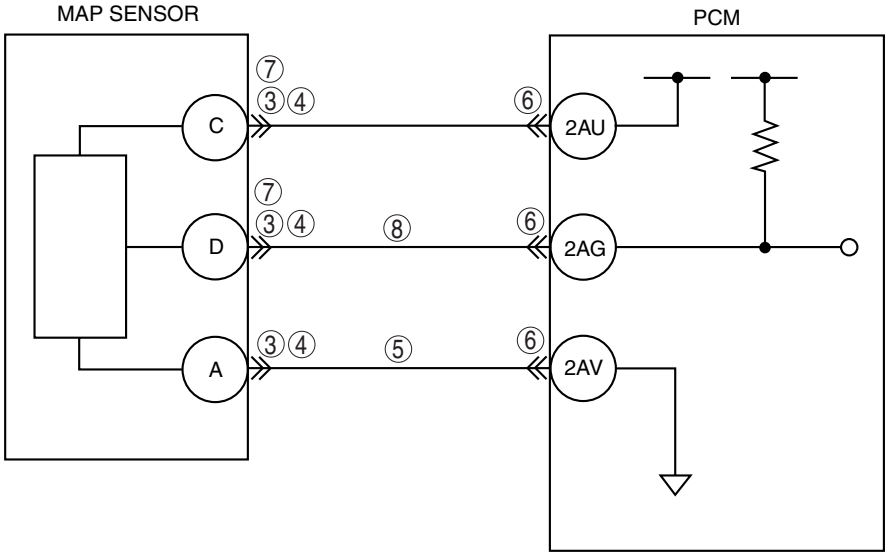
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Recorded FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY MAP PID WHEN MAP SENSOR CONNECTOR IS DISCONNECTED**<br>• Disconnect the MAP sensor connector.<br>• Is the voltage **above 4.9 V?** | Yes | Go to the next step. |
| | | No | Go to step 5. |
| 4 | **INSPECT POWER SUPPLY CIRCUIT VOLTAGE AT MAP SENSOR CONNECTOR**<br>**Note**<br>• If DTC P0122 and P2228 are also retrieved with P0107, go to the CONSTANT VOLTAGE troubleshooting procedure.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure voltage between MAP sensor terminal C (harness-side) and body ground.<br>• Is the voltage **within 4.5— 5.5 V?** | Yes | Check for a poor connection of MAP sensor terminal C (harness-side).<br>• Repair or replace the terminal if necessary.<br>• If normal, replace the MAP sensor.<br>Then go to Step 7. |
| | | No | Check for an open circuit between PCM terminal 2K (harness-side) and MAP sensor terminal C (harness-side). Repair or replace the suspected wiring harness, then go to Step 7. |
| 5 | **INSPECT MAP SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for continuity between MAP sensor terminal D (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT MAP SENSOR SIGNAL AND GROUND CIRCUIT FOR SHORT EACH OTHER**<br>• Check for continuity between MAP sensor terminals D and A (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0107 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

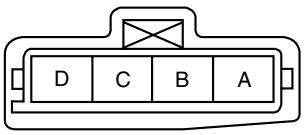
## DTC P0108[L3 WITH TC]

id010239803500

| DTC P0108 | MAP sensor circuit high input |
|---|---|
| DETECTION CONDITION | • PCM monitors input voltage from the MAP sensor when the intake air temperature is **above –10 °C {14 °F}**. If the input voltage is **above 4.9 V**, the PCM determines that MAP sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • MAP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit in the wiring harness between MAP sensor terminal A and PCM terminal 2AV<br>• Open circuit in the wiring harness between MAP sensor terminal D and PCM terminal 2AG<br>• MAP sensor signal circuit short to the constant voltage supply circuit<br>• PCM malfunction |

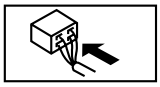


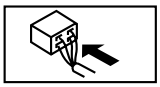

MAP SENSOR
HARNESS SIDE CONNECTOR




PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT CONNECTION OF MAP SENSOR CONNECTOR**<br>• Turn the ignition switch off.<br>• Verify that the MAP sensor connector is connected securely.<br>• Is the connection normal? | Yes | Go to the next step. |
| | | No | Reconnect the connector, then go to Step 9. |
| 4 | **INSPECT MAP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the MAP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the suspected terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 5 | **VERIFY MAP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between MAP sensor terminal A (harness-side) and body ground.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Inspect for an open circuit between PCM terminal 2AV (harness-side) and MAP sensor terminal A (harness-side). Repair or replace the suspected wiring harness, then go to Step 9. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **VERIFY MAP SENSOR SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT**<br>• Inspect for continuity between MAP sensor terminal D and C (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **VERIFY MAP SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between MAP sensor terminal D (harness-side) and PCM terminal 2AG (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0108 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to applicable inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0111[L3 WITH TC]

id010239803600

| DTC P0111 | IAT circuit performance problem |
|---|---|
| DETECTION CONDITION | • If the intake air temperature is higher than the engine coolant temperature by **18 °C {32.4 °F}** for **1.2 s** with the ignition switch turn in the ON position*, the PCM determines that there is an IAT sensor circuit range/ performance problem.<br>*: Ignition switch is in the ON position when **6 h or more** have passed since the ignition switch was turned off<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • IAT sensor malfunction<br>• Poor connection at MAF/IAT sensor or PCM connector<br>• PCM malfunction |

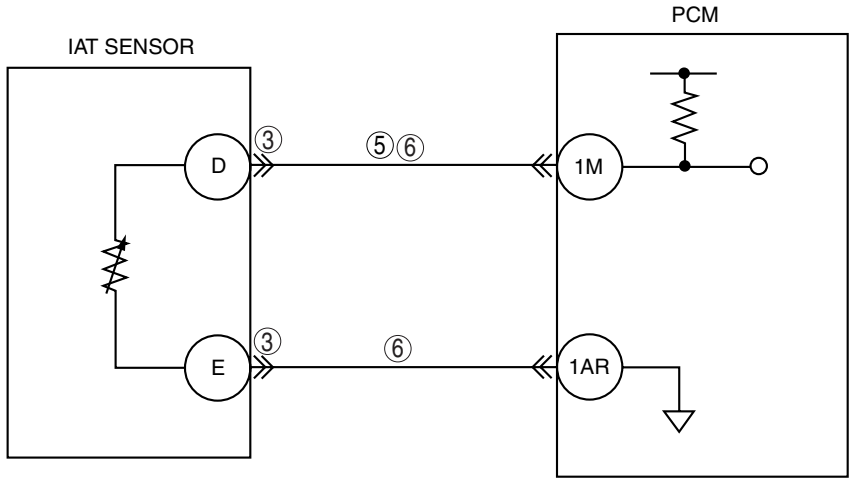
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT MAF/IAT SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAF/IAT sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |
| 4 | **INSPECT IAT SENSOR**<br>• Inspect IAT sensor. (See01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION[L3 WITH TC].)<br>• Is IAT sensor normal? | Yes | Replace MAF/IAT sensor, then go to Step 6. |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0111 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and run the engine under the FREEZE FRAME DATA condition.<br>• Is PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure“. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

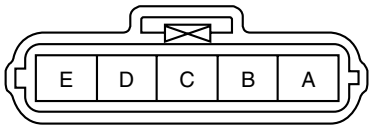
## DTC P0112[L3 WITH TC]

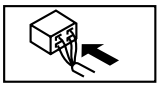
id010239803700

| DTC P0112 | IAT circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the IAT sensor signal. If the PCM detects on IAT sensor voltage **below 0.06 V**, the PCM determines that the IAT sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • IAT sensor malfunction<br>• Poor connection at the MAF/IAT sensor or PCM connector<br>• Short to ground between MAF/IAT sensor terminal D and PCM terminal 1M<br>• Short to each harness IAT signal circuit and IAT ground circuit.<br>• PCM malfunction |



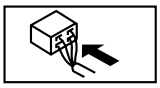

MAF/IAT SENSOR
HARNESS SIDE CONNECTOR



PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



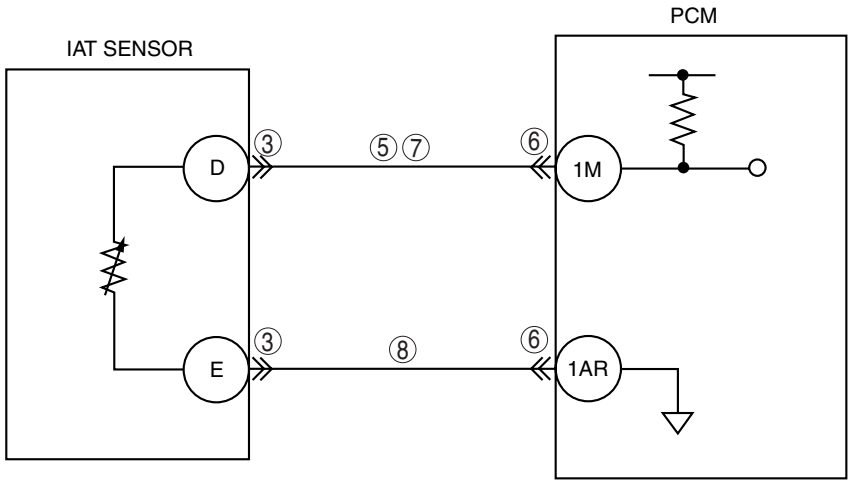
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT IAT SENSOR TERMINAL**<br>• Turn the ignition switch off.<br>• Disconnect the MAF/IAT sensor connector.<br>• Inspect for bent terminal of MAF/IAT sensor terminals D and E (part-side).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY IAT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION**<br>• Connect the M-MDS to DLC-2.<br>• Access the IAT PID.<br>• Verify the IAT value when disconnecting the MAF/IAT sensor connector.<br>• Does the IAT value change? | Yes | Replace the MAF/IAT sensor, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT IAT SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for continuity between MAF/IAT sensor terminal D (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT IAT CIRCUITS FOR SHORT**<br>• Inspect for continuity between MAF/IAT sensor terminals D and E (harness-side).<br>• Is there continuity? | Yes | Repair or the replace harness for a short, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0112 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

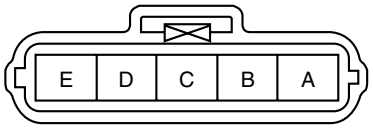
## DTC P0113[L3 WITH TC]

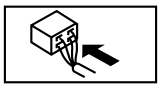
id010239803800

| DTC P0113 | IAT circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the IAT sensor signal. If the PCM detected IAT sensor voltage **above 4.9 V**, the PCM determines that the IAT sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • IAT sensor malfunction<br>• Open circuit between MAF/IAT sensor terminal D and PCM terminal 1M<br>• Short to the power supply between MAF/IAT sensor terminal D and PCM terminal 1M<br>• Open circuit between MAF/IAT sensor terminal E and PCM terminal 1AR<br>• Poor connection at the MAF/IAT sensor or the PCM connector.<br>• PCM malfunction |



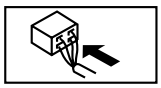

MAF/IAT SENSOR
HARNESS SIDE CONNECTOR



PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



### Diagnostic procedure

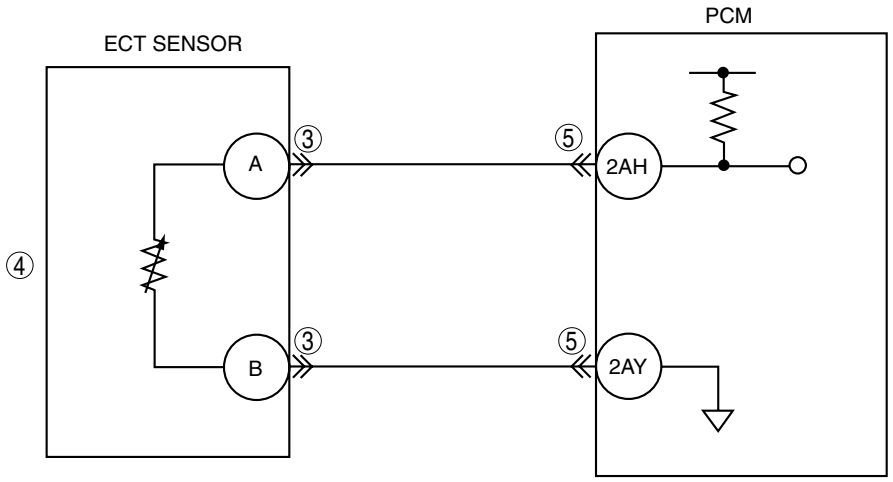
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT IAT SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the MAF/IAT sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY IAT SENSOR MALFUNCTION OR HARNESS MALFUNCTION**<br>• Connect the M-MDS to the DLC-2.<br>• Access the IAT PID.<br>• Connect a jumper wire between MAF/IAT sensor terminals D and E (harness-side).<br>• Verify the IAT value.<br>• Is the voltage **below 4.9 V?** | Yes | Replace the MAF/IAT sensor, then go to Step 9. |
| | | No | Go to the next step. |
| 5 | **INSPECT IAT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between MAF/IAT sensor terminal D (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or the wiring replace wiring harness for a short to the power supply, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect PCM connector.<br>• Inspect PCM terminals 1M and 1AR (harness-side) for tightness using a feeler tool.<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT IAT SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between MAF/IAT sensor terminal D (harness-side) and PCM terminal 2V (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| 8 | **INSPECT IAT SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between MAF/IAT sensor terminal E (harness-side) and PCM terminal 2H (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wi ring harness for an open circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0113 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

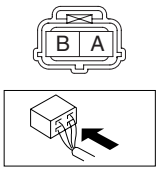
## DTC P0116[L3 WITH TC]

id010239803900

| DTC P0116 | ECT circuit range/performance problem |
|---|---|
| DETECTION CONDITION | • The PCM monitors the maximum value and minimum value of engine coolant temperature when the engine is started and**5 min** have been passed after leaving the vehicle **6 h or more**. If the difference between the maximum and the minimum values of the engine coolant temperature is **below 6 °C {10.8 °F}**, the PCM determines that there is an ECT circuit range/performance problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • ECT sensor malfunction<br>• Connector or terminal malfunction<br>• PCM malfunction |

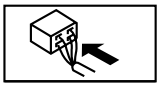



ECT SENSOR
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to ne, then go next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the ECT sensor connector.<br>• Inspect for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |

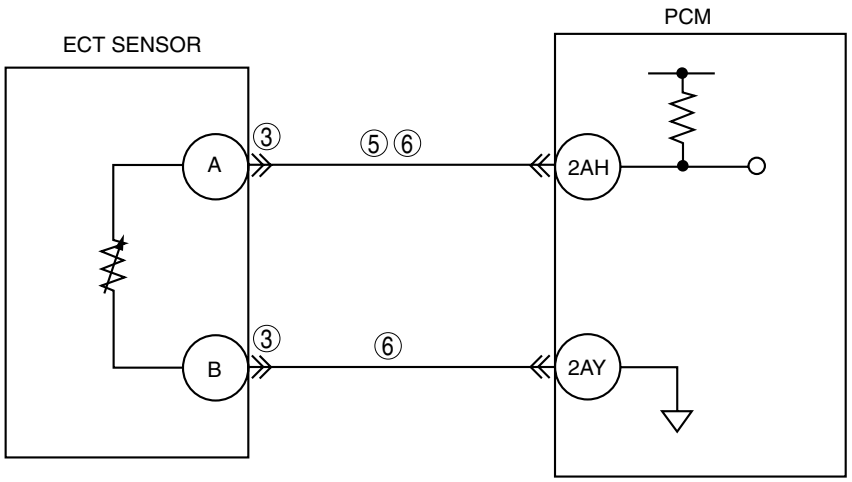
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT ECT SENSOR**<br>• Inspect the ECT sensor. (See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the ECT sensor, then go to Step 6. (See01-40-24 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged, pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0116 COMPLETED**<br>• Leave vehicle for**8 h.**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and wait for**5 min.**<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC])<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC]) |
| | | No | DTC troubleshooting completed. |

### DTC P0117[L3 WITH TC]

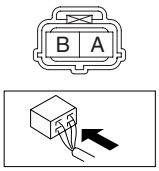
id010239804000

| DTC P0117 | ECT sensor circuit low input |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the ECT sensor signal. If the PCM detects the ECT sensor voltage **below 0.2 V**, the PCM determines that the ECT sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Engine cooling system).<br>• The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • ECT sensor malfunction<br>• Connect or terminal malfunction<br>• Short to ground in the wiring harness between ECT sensor terminal A and PCM connector terminal 2AH<br>• Short to each wiring harness in ECT signal circuit and ECT ground circuit<br>• PCM malfunction |

| DTC P0117 | ECT sensor circuit low input |
|---|---|

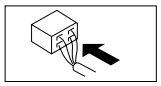



ECT SENSOR
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Engine cooling system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FOR BENT TERMINALS**<br>• Turn the ignition switch off.<br>• Disconnect the ECT sensor connector.<br>• Inspect ECT sensor terminals A and B (part-side) for bending.<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY ECT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION**<br>• Connect the M-MDS to DLC-2.<br>• Access the ECT PID.<br>• Verify the ECT value when disconnecting the ECT sensor connector.<br>• Does the ECT value change? | Yes | Replace the ECT sensor, then go to Step 7.<br>(See01-40-24 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

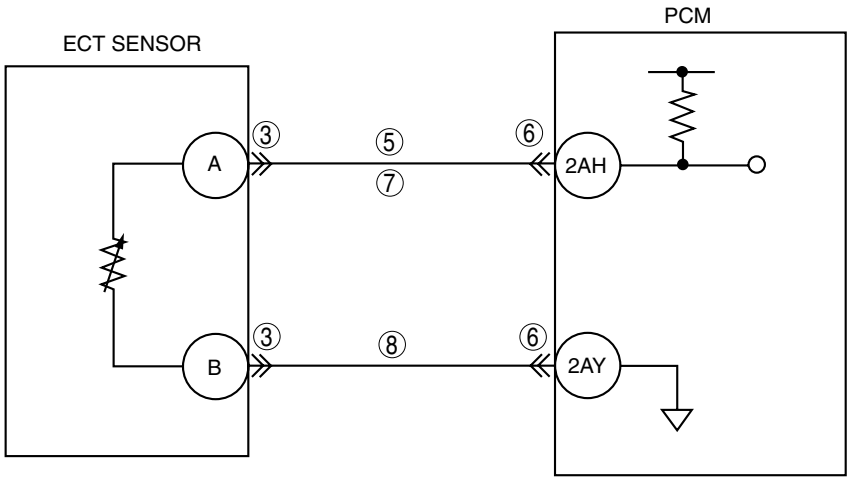
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT ECT SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between ECT sensor terminal A (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT ECT CIRCUIT FOR SHORT TO WIRING HARNESSES**<br>• Inspect for continuity between ECT sensor terminal A and B (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0117 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0118[L3 WITH TC]

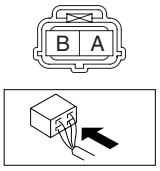
id010239804100

| DTC P0118 | ECT sensor circuit high input |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the ECT sensor signal. If the PCM detects the ECT sensor voltage is **above 4.6 V**, the PCM determines that the ECT sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Engine cooling system).<br>• The MIL illuminates if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • ECT sensor malfunction<br>• Connect or terminal malfunction<br>• Open circuit in the wiring harness between ECT sensor terminal A and PCM terminal 2AH<br>• Short to power supply in the wiring harness between ECT sensor terminal A and PCM terminal 2AH<br>• Open circuit in the wiring harness between ECT sensor terminal B and PCM terminal 2AY<br>• PCM malfunction |

| DTC P0118 | ECT sensor circuit high input |
|---|---|

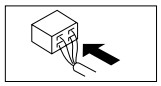



ECT SENSOR
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Engine cooling system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT POOR CONNECTION OF ECT SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect ECT sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion.)<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY ECT SENSOR MALFUNCTION OR WIRING HARNESS MALFUNCTION**<br>• Connect the M-MDS to the DLC-2.<br>• Access the ECT PID.<br>• Connect a jumper wire between ECT sensor terminals A and B.<br>• Verify the ECT value.<br>• Is the voltage **4.6 V or below**? | Yes | Replace the ECT sensor, then go to Step 9. |
| | | No | Go to the next step. |

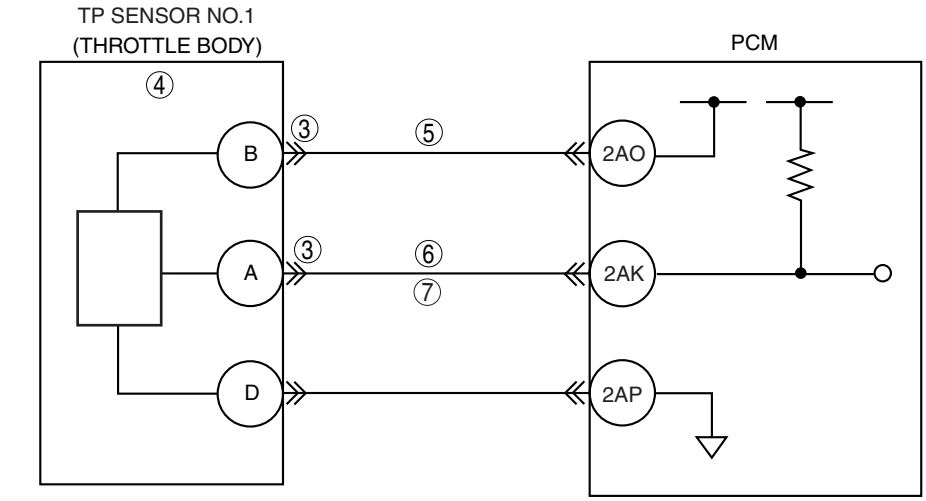
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT ECT SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between ECT sensor terminal A (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a short to power supply, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion.)<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT ECT SENSOR SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect the continuity between ECT sensor terminal A (wiring harness-side) and PCM terminal 2AH.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| 8 | **INSPECT ECT SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between ECT sensor terminal B (wiring harness-side) and PCM terminal 2AY.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0118 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0122[L3 WITH TC]

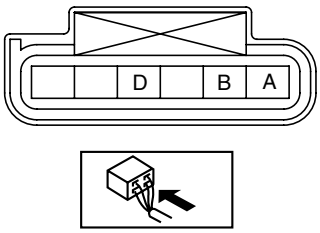
id010239804200

| DTC P0122 | TP sensor No.1 circuit low input |
|---|---|
| **DETECTION CONDITION** | • If the PCM detects that the TP sensor No.1 voltage is **below 0.2 V** after the ignition switch is turned to the ON position, the PCM determines that TP circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • TP sensor malfunction<br>• Connector or terminal malfunction<br>• Short to ground between throttle body terminal A and PCM terminal 2AK<br>• Open circuit between throttle body terminal B and PCM terminal 2AO |

| DTC P0122 | TP sensor No.1 circuit low input |
|---|---|




THROTTLE BODY
HARNESS SIDE CONNECTOR




PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY TP SENSOR OR HARNESS MALFUNCTION**<br>• Connect the M-MDS.<br>• Access the TP1 PID.<br>• Disconnect the throttle body connector.<br>• Connect a jumper wire between throttle body terminals A and B (harness-side).<br>• Is the voltage **above 4.9 V?** | Yes | Go to the next step. |
| | | No | Go to step 5. |
| 4 | **INSPECT TP SENSOR**<br>• Perform the TP sensor inspection. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the TP sensor normal? | Yes | Inspect for poor throttle body connector terminal B connection. Repair or replace if necessary, then go to Step 8. |
| | | No | Replace throttle body, then go to Step 8. |

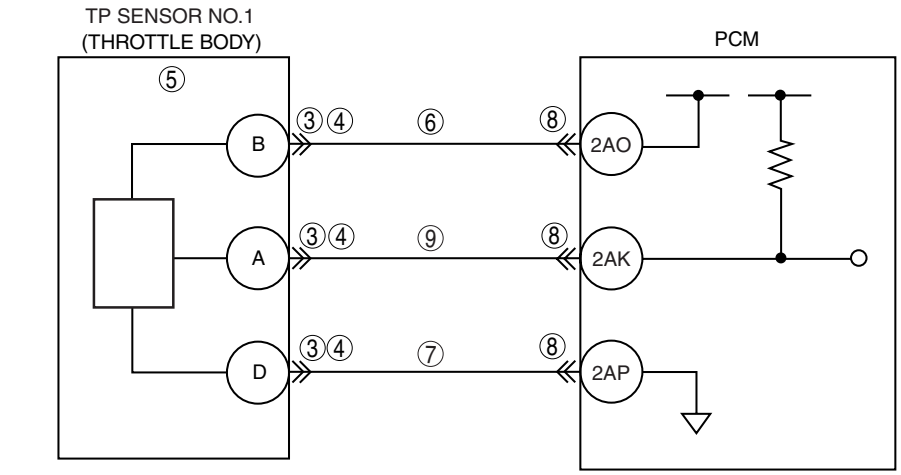
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT POWER SUPPLY CIRCUIT VOLTAGE AT THROTTLE BODY CONNECTOR**<br><br>**Note**<br>• If DTC P0107 and P2228 are also retrieved with P0122, go to CONSTANT VOLTAGE troubleshooting procedure.<br><br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage at throttle body terminal B (harness-side).<br>• Is the voltage **within 4.5— 5.5 V?** | Yes | Go to the next step. |
| | | No | Repair or replace for an open circuit between throttle body connector terminal B (harness-side) and PCM connector terminal 2AO (harness-side).<br>Then, then go to Step 8. |
| 6 | **VERIFY TP1 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between throttle body terminal A (harness-side) and PCM terminal 2AK (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected harness, then go to Step 8. |
| 7 | **VERIFY TP1 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between throttle body terminal A (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0122 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

**DTC P0123[L3 WITH TC]**

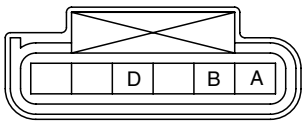
id010239804300

| DTC P0123 | TP sensor No.1 circuit high input |
|---|---|
| DETECTION CONDITION | • If the PCM detects that the TP sensor No.1 voltage is **above 4.9 V** after ignition switch to the ON position, PCM determines that TP circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • TP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between throttle body terminal B and PCM terminal 2AO<br>• Open circuit between throttle body terminal D and PCM terminal 2AP<br>• Short to the constant voltage supply circuit between throttle body terminal A and PCM terminal 2AK |

| DTC P0123 | TP sensor No.1 circuit high input |
|---|---|

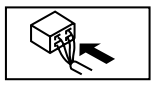


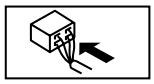

THROTTLE BODY
HARNESS SIDE CONNECTOR




PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT THROTTLE BODY CONNECTOR**<br>• Turn the ignition switch off.<br>• Verify that the throttle body connector is connected securely.<br>• Is connector normal? | Yes | Go to the next step. |
| | | No | Connect the connector securely, then go to Step 10. |
| 4 | **INSPECT THROTTLE BODY CONNECTION FOR POOR CONNECTION**<br>• Disconnect throttle body connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the suspected wiring terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT TP SENSOR**<br>• Perform the TP sensor inspection. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC])<br>• Is the TP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to Step 10. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT TP1 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between throttle body terminal B (harness-side) and body ground.<br>• Is the voltage **above 4.9 V?** | Yes | Go to the next step. |
| | | No | Repair or replace for short to a power supply. Then, go to Step 10. |
| 7 | **VERIFY TP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between throttle body connector terminal D (harness-side) and PCM connector terminal 2AP.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace for an open circuit between TP sensor connector terminal B (harness-side) and PCM connector terminal 3P (harness-side). Then, go to Step 10. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 10. |
| | | No | Go to Step 10. |
| 9 | **VERIFY TP SIGNAL CIRCUIT FOR SHORT TO CONSTANT VOLTAGE CIRCUIT**<br>• Inspect for continuity between throttle body terminals A and B (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0123 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0125[L3 WITH TC]

id010239804400

| DTC P0125 | Excessive time to enter closed loop fuel control |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the ECT sensor signal after the engine is started while the engine is cold. If the engine coolant temperature does not reach the expected temperature for a specified period, the PCM determines that it has taken an excessive amount of time for the engine coolant temperature to reach the temperature necessary to start closed-loop fuel control.<br>**Diagnostic support note**<br>• This is a continuous monitor (Engine cooling system).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • ECT sensor malfunction<br>• Cooling system malfunction<br>• Poor connection of connectors<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Engine cooling system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED SERVICE INFORMATION AVAILABILITY**<br>• Verify related Service Information availability.<br>• Is any related Service Information available? | Yes | Perform the repair or diagnosis according to available Service Information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY CURRENT INPUT SIGNAL STATUS: IS CONCERN INTERMITTENT OR CONSTANT**<br>• Start the engine.<br>• Warm up the engine completely.<br>• Access the ECT PID using the M-MDS.<br>• Is the ECT PID **above 60 °C {140 °F}?** | Yes | Intermittent concern exists. Go to the INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT ECT SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the ECT sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion.)<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT ECT SENSOR**<br>• Inspect the ECT sensor. (See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the ECT sensor, then go to Step 7. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion.)<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0125 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Access the ECT PID using the M-MDS.<br>• Wait until ECT PID **below 8 °C {46 °F}.**<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0126, P0128[L3 WITH TC]

id010239815400

| | |
|---|---|
| **DTC P0126<br>DTC P0128** | **Coolant thermostat stuck open** |
| **DETECTION CONDITION** | **DTC P0126**<br>• If the ECT signal never exceeds **71 °C {160 °F}** after engine start for specified period, PCM determines that the coolant thermostat is stuck open.<br>**MONITORING CONDITIONS**<br>— IAT: **above –10 °C {14 °F}**<br>— Vehicle speed: **over 9.4 km/h {5.8 mph}**<br>**DTC P0128**<br>• PCM monitors MAF, IAT, VSS and EAT signals and calculate radiator heat radiation ratio while following monitoring conditions are met. If calculated value exceeds threshold, PCM determines that the coolant thermostat is stuck open.<br>**MONITORING CONDITIONS**<br>— ECT at engine start: **below 36 °C {97 °F}**<br>— IAT: **above –10 °C {14 °F}**<br>— Difference between ECT at engine start and minimum IAT: **below 6 °C {10.8 °F}**<br>— Vehicle speed: **over 32 km/h {20 mph}**<br>**Diagnostic support note**<br>• This is an intermittent monitor (Engine cooling system).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if PCM detects the above malfunction condition during first the drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTC is stored in PCM memory.<br>• DIAGNOSTIC MONITORING TEST RESULTS is available. |
| **POSSIBLE CAUSE** | • ECT sensor malfunction<br>• Coolant thermostat malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Engine cooling system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FOR OTHER DTCS**<br>• Have other DTCs been stored? | Yes | Repair circuit malfunction for applicable DTCs. |
| | | No | Go to the next step. |
| 4 | **INSPECT COOLANT THERMOSTAT FOR WHETHER STUCK OPEN**<br>• Perform coolant thermostat inspection.<br>• Is coolant thermostat normal? | Yes | Inspect ECT sensor.<br>Replace ECT sensor if necessary, then go to the next step. |
| | | No | Replace coolant thermostat, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY MONITORING CONDITION FOR REPAIR VERIFICATION**<br>• Make sure to reconnect all disconnected connectors.<br>• Cool down engine.<br><br>**Note**<br>• If workshop inside and outside temperature difference is significant, PCM might not operate thermostat monitor. Therefore, it is recommended to cool down engine out of workshop.<br><br>• Turn ignition switch to ON (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Access ECT, IAT PIDs and make sure that each value is within following specifications.<br>— ECT: **below 36 °C {97 °F}** (for P0128 only)<br>— IAT: **above –10°C {14°F}**<br>— Difference between ECT and IAT: **below 6°C {43°F}**<br>• Is there any PID that is out of specification? | Yes | Take corrective action (e.g. cool down engine), then repeat this step. |
| | | No | Go to the next step for DTC P0126 or go to step 7 for DTC P0128. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0126 COMPLETED**<br>• Start engine and turn off E/L and A/C.<br>• Access DIAGNOSTIC MONITORING TEST RESULTS using the M-MDS and monitor TEST #10: E1: 81 (ECT).<br><br>**Note**<br>• This test requires actual driving. Chassis roller cannot be used for this test.<br>• During test drive, constant speed should be maintained, although 2 or 3 stops during every**5 minutes** of driving time (e.g. for traffic signals) is acceptable. Stop-and-go (e.g. in case of traffic congestion) is not acceptable during the test period.<br>• Test period depends on ECT at engine start. (e.g. if ECT is **–10°C {14°F}**, monitoring period is**38 minutes** and ECT is **30 °C {86 °F}**, monitoring period is **8 minutes**)<br><br>• Verify TEST #10: E1: 81 (ECT) value.<br>• Is value above minimum value? | Yes | Go to Step 8. |
| | | No | Replace PCM, then go to Step 8. |

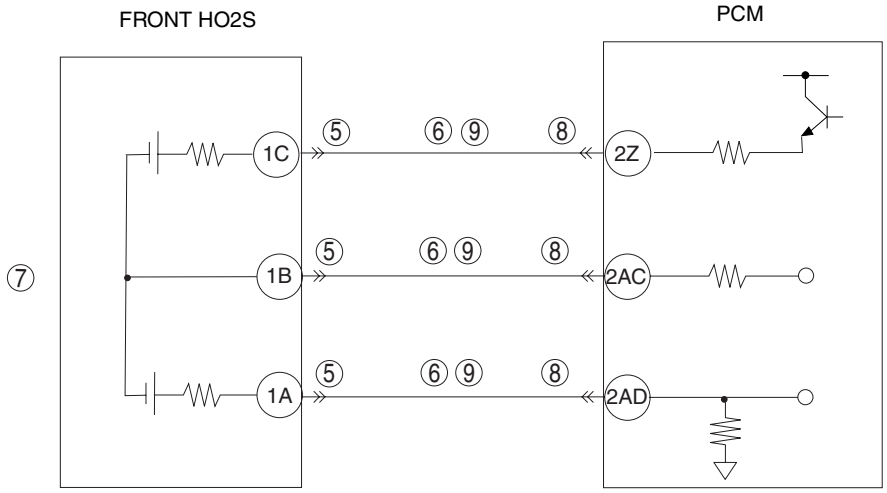
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0128 COMPLETED**<br>• Start engine and turn off E/L and A/C.<br>• Access DIAGNOSTIC MONITORING TEST RESULTS using the M-MDS and monitor TEST #10: E1: 80 (Heat radiation ratio) or #10: E1: 81 (ECT).<br><br>**Note**<br>• This test requires actual driving. Chassis roller cannot be used for this test.<br>• During test drive, constant speed should be maintained, although 2 or 3 stops (e.g. for traffic signals) is acceptable. Stop-and-go (e.g. in case of traffic congestion) is not acceptable during the test period.<br><br>• Verify TEST #10: E1: 80 (Heat radiation ratio) and #10: El: 81 (ECT) value.<br>• Are value of TEST #10: E1: 80 (Heat radiation ratio) below maximum value and value of TEST #10: E1: 81 (ECT) above minimum value? | Yes | Go to the next step. |
| | | No | Replace PCM, then go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>• Is any DTC present? | Yes | Go to the applicable DTC inspection. |
| | | No | Troubleshooting completed. |

**DTC P0131[L3 WITH TC]**

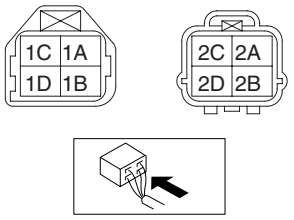
id010239804600

| DTC P0131 | Front HO2S circuit low input |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the input voltage from the front HO2S when the engine is running. If the input voltage is **above 1.0 V** for **25 s**, the PCM determines that the front HO2S circuit voltage is low.<br>**Diagnostic support note**<br>• This is a continuance monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Front HO2S malfunction<br>• Connector or terminal malfunction<br>• Open circuit in the wiring harness between front HO2S terminal 1C and PCM terminal 2Z<br>• Short to ground in the wiring harness between front HO2S terminal 1C and PCM terminal 2Z<br>• Open circuit in the wiring harness between front HO2S terminal 1B and PCM terminal 2AC<br>• Short to ground in the wiring harness between front HO2S terminal 1B and PCM terminal 2AC<br>• Short to ground in the wiring harness between front HO2S terminal 1A and PCM terminal 2AD<br>• PCM malfunction |

| DTC P0131 | Front HO2S circuit low input |
|---|---|




FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

**Diagnostic procedure**

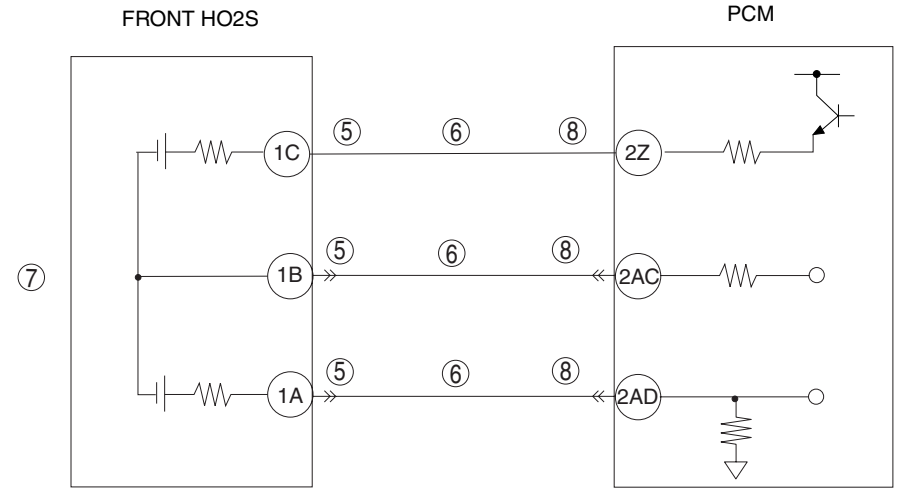
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING OR STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the pending code or stored DTCs using the M-MDS.<br>• Are other DTCs present? | Yes | Go to the appropriate DTC troubleshooting procedures. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0131 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for the DTC on the FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT FRONT HO2S CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals and body ground:<br>— Front HO2S terminal 1A (wiring harness-side) and body ground<br>— Front HO2S terminal 1B (wiring harness-side) and body ground<br>— Front HO2S terminal 1C (wiring harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT FRONT HO2S**<br>• Inspect the front HO2S. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the front HO2S, then go to Step 10. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FRONT HO2S CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following circuits:<br>— Front HO2S terminal 1B (wiring harness-side) and PCM terminal 2AC (wiring harness-side)<br>— Front HO2S terminal 1C (wiring harness-side) and PCM terminal 2Z (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0131 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

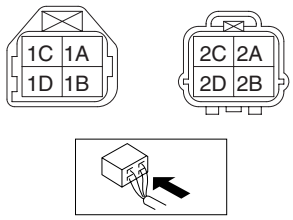
## DTC P0132[L3 WITH TC]

id010239804700

| DTC P0132 | Front HO2S circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input voltage from the front HO2S when the engine is running. If the input voltage is **less than 1.0 V** for **2 s**, the PCM determines that the front HO2S circuit voltage is high.<br>**Diagnostic support note**<br>• This is a continuance monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• The DTC is stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Connector or terminal malfunction<br>• Short to the power supply in the wiring harness between front HO2S terminal 1C and PCM terminal 2Z<br>• Short to the power supply in the wiring harness between front HO2S terminal 1B and PCM terminal 2AC<br>• Short to the power supply in the wiring harness between front HO2S terminal 1A and PCM terminal 2AD<br>• PCM malfunction |




FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING OR STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the pending code or stored DTCs using the M-MDS.<br>• Are other DTCs present? | Yes | Go to the appropriate DTC troubleshooting procedures. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0132 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for the DTC on the FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT FRONT HO2S CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the following terminals and body ground:<br>— Front HO2S terminal 1A (wiring harness-side) and body ground<br>— Front HO2S terminal 1B (wiring harness-side) and body ground<br>— Front HO2S terminal 1C (wiring harness-side) and body ground<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a possible short to the power supply, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT FRONT HO2S**<br>• Inspect the front HO2S. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the front HO2S, then go to Step 9. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0132 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P0133[L3 WITH TC]

id010239804800

| DTC P0133 | Front HO2S circuit slow response |
|---|---|
| DETECTION CONDITION | • An oxygen sensor malfunction can be detected by measuring the average frequency of the oxygen sensor signal, time required to pass from rich to lean, and the time required to pass from lean to rich.<br>• The average frequency of the oxygen sensor signal is more than the threshold value.<br>**MONITORING CONDITIONS**<br>— HO2S heater, HO2S, and TWC Repair Verification Drive Mode<br>— The following conditions are met:<br>• Front HO2S heater monitor is completed.<br>• ECT sensor and front HO2S heater are normal<br>• Engine speed: **1,750— 3,500 rpm.**<br>• Charging efficiency: **35— 63%** (at engine speed of **2,500 rpm**)<br>• Fuel system loop status is closed loop fuel control.<br>• Engine coolant temperature **above 70 °C {158 °F}**<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• DIAGNOSTIC MONITORING TEST RESULTS is available.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S deterioration<br>• Front HO2S malfunction<br>• Front HO2S looseness<br>• Fuel pressure sensor malfunction<br>• Clogged or restricted fuel line<br>• Fuel leakage in the fuel line between the fuel delivery pipe and the fuel pump<br>• Exhaust system leakage<br>• Purge solenoid valve malfunction<br>• Improper connection purge solenoid hose<br>• Insufficient compression<br>• Engine malfunction (Engine coolant leakage) |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING AND STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the pending or stored DTCs using the M-MDS.<br>• Is DTC P0443 also present? | Yes | Go to DTC P0443 troubleshooting procedures, then go to Step 14. |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0133 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Warm up the engine.<br>• Access the O2S11 PID using the M-MDS.<br>• Inspect the PID under the following accelerator pedal conditions in NEUTRAL.<br>• Is the PID normal?<br>— **Less than 1mA** when the accelerator pedal is suddenly depressed (rich condition).<br>— **More than 1mA** just after accelerator pedal is released (lean condition). | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT INSTALLATION OF FRONT HO2S**<br>• Inspect if the front HO2S is loosely installed.<br>• Is the front HO2S installed securely? | Yes | Go to the next step. |
| | | No | Retighten the front HO2S, then go to Step 14. |
| 7 | **INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM**<br>• Visually inspect if any gas leakage is found between the exhaust manifold and front HO2S.<br>• Is there gas leakage? | Yes | Repair or replace the malfunctioning exhaust part, then go to Step 14. |
| | | No | Replace sensor, then go to Step 14. |
| 8 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor the FUEL PRES PID.<br>• Is the FUEL PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 13. |
| | | No | Go to the next step. |
| 9 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 11. |
| 10 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the fuel delivery pipe, then go to Step 14. |
| 11 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump.<br>• Monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Retest Step 14. |
| | | No | Go to the next step. |
| 12 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. Then go to Step 14. |
| 13 | **INSPECT SEALING OF ENGINE COOLANT PASSAGE**<br>• Perform the “ENGINE COOLANT LEAKAGE INSPECTION”.<br>(See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to the inspection results.<br>Then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 14 | **VERIFY TROUBLESHOOTING OF DTC P0133 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position. (Engine off)<br>• Clear the DTC from the memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 15 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

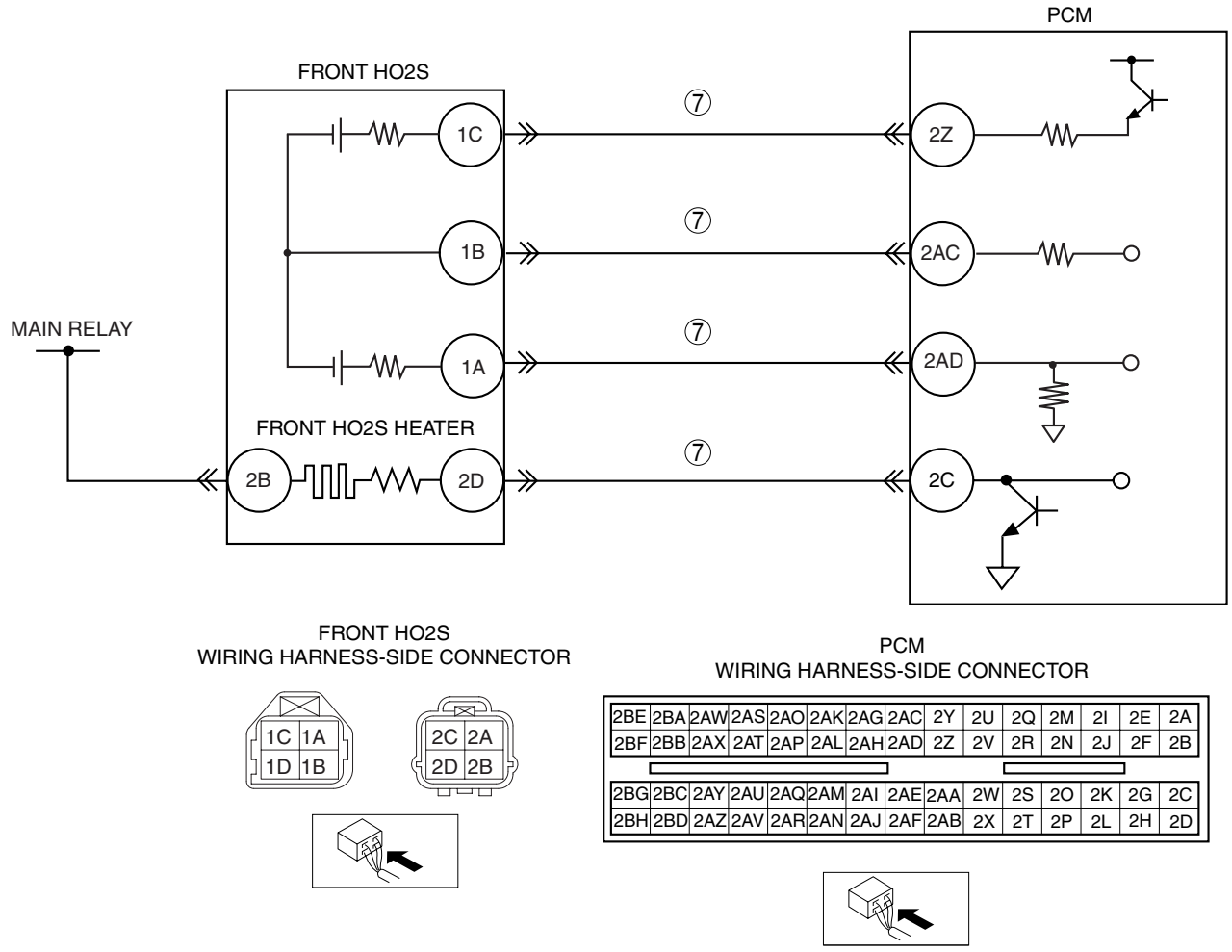


### DTC P0134[L3 WITH TC]

id010239804900

| DTC P0134 | Front HO2S no activity detected |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the input voltage from the HO2S when the following conditions are met. If under the following monitoring conditions, the input voltage **more than 3.22 V**, the PCM determines that the front HO2S is not activated.<br>**MONITORING CONDITIONS**<br>— HO2S, HO2S heater and TWC Repair Verification Drive Mode<br>— The following conditions are met<br>• Front HO2S heater is tuned on for **above 30 s**<br>• Battery voltage: **10— 18 V**<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Front HO2S deterioration<br>• Front HO2S heater malfunction<br>• Leakage exhaust system<br>• Open or short circuit in the wiring harness between front HO2S terminal 2D and PCM terminal 2C<br>• Open or short circuit in the wiring harness between front HO2S terminal 1C and PCM terminal 2Z<br>• Open or short circuit in the wiring harness between front HO2S terminal 1B and PCM terminal 2AC<br>• Open or short circuit in the wiring harness between front HO2S terminal 1A and PCM terminal 2AD<br>• Insufficient compression<br>• Engine malfunction |

| DTC P0134 | Front HO2S no activity detected |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING AND STORED DTC**<br>**Note**<br>• If fuel monitor, DTC P0132 is retrieved, ignore it until P0134 is fixed.<br>• Turn the ignition switch off, then to the ON position. (Engine off)<br>• Verify pending and stored DTCs using the M-MDS.<br>• Is the DTC P2237 or P2251 also present? | Yes | Go to the appropriate DTC troubleshooting procedures. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0134 on the FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for the DTC on the FREEZE FRAME DATA.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Warm up the engine.<br>• Access O2S11 PID using the M-MDS.<br>• Verify the PID while racing engine in NEUTRAL.<br>• Is the PID normal?<br>— **–1.0— 1.0 A** when idle<br>— **More than 0.25 mA** just after releasing the of accelerator pedal is released (lean condition) | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT INSTALLATION OF FRONT HO2S**<br>• Inspect if the front HO2S is loosely installed.<br>• Is the sensor installed securely? | Yes | Go to the next step. |
| | | No | Install the sensor securely, then go to Step 10. |
| 7 | **INSPECT EXHAUST SYSTEM FOR GAS LEAKAGE**<br>• Visually inspect if there is any gas leakage between the exhaust manifold and front HO2S.<br>• Is there gas leakage? | Yes | Repair or replace any malfunctioning exhaust part, then go to Step 10. |
| | | No | • Inspect the following wiring harnesses at the wiring harness-side connector terminals for an open circuit, repair or the replace wiring harness if necessary.<br>— Front HO2S terminal 1A and PCM terminal 2AD<br>— Front HO2S terminal 1B and PCM terminal 2AC<br>— Front HO2S terminal 1C and PCM terminal 2Z<br>— Front HO2S terminal 2D and PCM terminal 2C<br>• If all the items above are normal, replace the malfunctioning sensor.<br>Then go to Step 10. |
| 8 | **INSPECT SEALING OF ENGINE COOLANT PASSAGE**<br>• Perform the ENGINE COOLANT LEAKAGE INSPECTION.<br>(See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part according to the inspection results, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Perform the engine overhaul for repairs, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0134 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position. (Engine off)<br>• Clear the DTC from the memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode and the HO2S heater, HO2S, and TWC Repair Verification Drive Mode.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

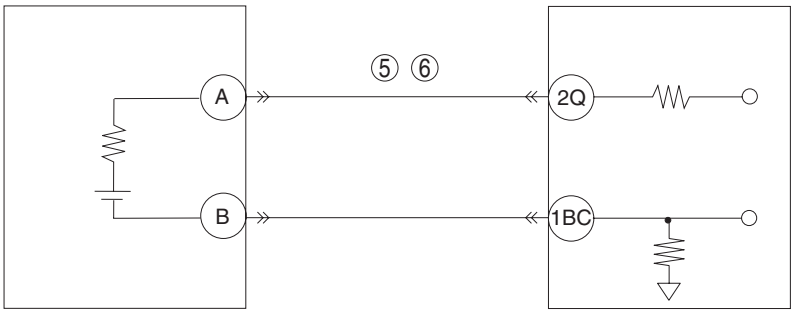
## DTC P0137[L3 WITH TC]

id010239805000

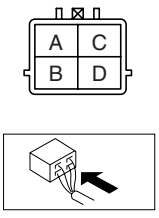
| DTC P0137 | Rear HO2S circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input voltage from the rear HO2S. If the input voltage from the rear HO2S sensor is **below 0.1 V** for **41.6 s**, the PCM determines that the circuit input is low.<br>**MONITORING CONDITIONS**<br>— HO2S,HO2S heater and TWC repair verification drive mode.<br>— The following conditions are met.<br>• Engine speed is above **1,500 rpm**.<br>• Engine coolant temperature is **above 70 °C {158 °F}**.<br>• Fuel injector control in rear HO2S is in closed loop control.<br>• The PCM monitors the input voltage from the rear HO2S when the following conditions are met. Under the following monitoring conditions, if the input voltage from the rear HO2S does not exceed **0.1 V** through the short term fuel trim is controlled up to **20.5%** for **9.6 s**, the PCM determines that the sensor circuit input is low.<br>**MONITORING CONDITIONS**<br>— HO2S,HO2S heater and TWC repair verification drive mode.<br>— The following conditions are met for **more than 20.8 s**.<br>• Engine speed is **more than 1,500 rpm**.<br>• Engine coolant temperature is **more than 70 °C {158 °F}**.<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if PCM detects the above malfunction conditions during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Rear HO2S malfunction<br>• Open circuit or short to ground in wiring between rear HO2S terminal A and PCM terminal 2Q<br>• PCM malfunction |

REAR HO2S

PCM



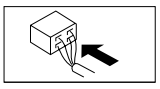

REAR HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs using the M-MDS.<br>• Are other DTCs present? | Yes | Go to appropriate DTC troubleshooting procedure. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0137 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to the troubleshooting for the DTC on the FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **INSPECT REAR HO2S SIGNAL CIRCUIT FOR SHORT TO GROUND AT HARNESS**<br>• Turn the ignition switch off.<br>• Disconnect rear HO2S and PCM connectors.<br>• Verify the continuity between rear HO2S sensor terminal A (wiring harness side) and body ground.<br>• Is there continuity? | Yes | Repair for a short to ground circuit, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT REAR HO2S SIGNAL CIRCUIT FOR SHORT TO GROUND AT REAR HO2S**<br>• Rear HO2S connector disconnected.<br>• Verify the continuity between rear HO2S sensor terminal A (part side) and body ground.<br>• Is there continuity? | Yes | Replace the rear HO2S then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0137 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

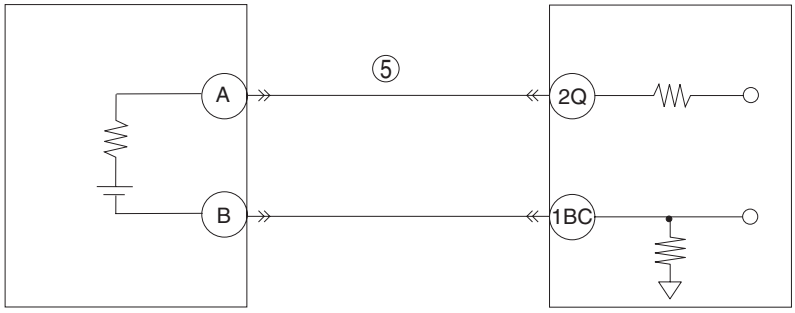
## DTC P0138[L3 WITH TC]

id010239805100

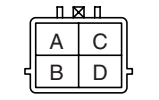
| DTC P0138 | Rear HO2S circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input voltage from the rear HO2S. If the input voltage from the rear HO2S sensor is **above 1.2 V** for **0.8 s**, the PCM determines that the circuit input is high.<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Rear HO2S malfunction<br>• Short to power supply in the wiring harness between rear HO2S terminal A and PCM terminal 2Q<br>• Rear HO2S or PCM terminal shorted<br>• PCM malfunction |

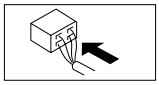
REAR HO2S

PCM




REAR HO2S
WIRING HARNESS-SIDE CONNECTOR

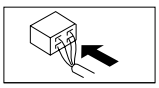


PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED SERVICE INFORMATION AVAILABILITY**<br>• Verify related service bulletins and/or repair Information availability.<br>• Is any related Service Information available? | Yes | Perform the repair or diagnosis according to available Service Information.<br>• If vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING OR STORED DTC**<br>• Turn the ignition switch off, then to the ON position. (Engine off)<br>• Verify pending code or stored DTCs using M-MDS.<br>• Is other DTC present? | Yes | Go to the appropriate DTC troubleshooting procedures. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0138 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to the troubleshooting procedures for the DTC on the FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **INSPECT REAR HO2S SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch off.<br>• Disconnect rear HO2S connector.<br>• Turn the ignition switch to the ON position. (Engine off)<br>• Measure the voltage between rear HO2S terminal A (wiring harness-side) and body ground.<br>• Is there any voltage? | Yes | Replace short to power supply, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Start the engine.<br>• Access the O2S12 PID using the M-MDS.<br>• Verify the PID while racing the engine at least **10 times** in NEUTRAL.<br>• Does the PID stay **above 0.55 V**? | Yes | Replace the sensor, then go to the next step. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0138 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position. (Engine off)<br>• Clear the DTC from the memory using the M-MDS.<br>• Run the PCM adaptive memory procedure drive mode and HO2S heater, HO2S, and TWC repair verification drive mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0139[L3 WITH TC]

id010239805200

| DTC P0139 | Rear HO2S circuit problem |
|---|---|
| DETECTION CONDITION | • The PCM monitors the rich (**0.4 V**) to lean (**0.3 V**) response time of the rear HO2S. The PCM measures the response time when the following conditions are met. The PCM determines that the rear HO2S response deteriorated when the measured response time is more than the threshold value (**130 ms**) five consecutive times.<br>**MONITORING CONDITIONS**<br>— HO2S heater, HO2S, and TWC Repair Verification Drive Mode or EGR, HO2S heater, HO2S, TWC, and EVAP System Repair Verification Drive Mode<br>— The following conditions are met:<br>• Fuel cut during deceleration<br>• Engine speed is **more than 500 rpm**.<br>• Engine coolant temperature is **more than 70 °C {158 °F}**.<br>• HO2S (rear) output voltage is **more than 0.4 V**.<br>• The PCM monitors for a time-out malfunction (when rear HO2S remains above **0.3 V** for longer than a specified period of time during fuel cut control). The PCM measure the amount of time from when the following conditions are met until the rear HO2S output voltage drops **below 0.3 V**. The PCM determines that a HO2S time-out malfunction has occurred when the detected time is more than the threshold value (**6.4 s**) three consecutive times.<br>**MONITORING CONDITIONS**<br>— HO2S heater, HO2S, and TWC Repair Verification Drive Mode or EGR, HO2S heater, HO2S, TWC, and EVAP System Repair Verification Drive Mode<br>— The following conditions are met:<br>• Fuel cut during deceleration<br>• Engine speed is **more than 500 rpm**.<br>• Engine coolant temperature is **more than 70 °C {158 °F}**.<br>• HO2S (rear) is activated (**more than 0.55 V**).<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• DIAGNOSTIC MONITORING TEST RESULTS is available.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Rear HO2S deterioration<br>• Rear HO2S malfunction<br>• Rear HO2S looseness<br>• Pressure regulator (built-in fuel pump unit) malfunction<br>• Fuel pump malfunction<br>• Fuel filter (built-in fuel pump unit) clogged or restricted<br>• Fuel leakage on fuel line from fuel delivery pipe to fuel pump<br>• Exhaust system leakage<br>• Purge solenoid valve malfunction<br>• Improper connection of purge solenoid hoses<br>• Insufficient compression<br>• Engine malfunction (Leakage engine coolant) |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available Service Information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING AND STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify pending and/or stored DTCs using the M-MDS.<br>• Is DTC P0443 also present? | Yes | Go to DTC P0443 troubleshooting procedures, then go to Step 13. |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0139 on the FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for the DTC on the FREEZE FRAME DATA.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Warm up the engine.<br>• Access the O2S12 PID using the M-MDS.<br>• Inspect the PID under the following accelerator pedal conditions or NEUTRAL.<br>• Is the PID normal?<br>— **More than 0.55 V** the accelerator pedal is suddenly depressed (rich condition).<br>— **Less than 0.55 V** just after accelerator pedal is released (lean condition). | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT INSTALLATION OF REAR HO2S**<br>• Inspect if the rear HO2S is loosely installed.<br>• Is the sensor installed securely? | Yes | Go to the next step. |
| | | No | Retighten the sensor, then go to Step 13. |
| 7 | **INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM**<br>• Visually inspect if there is any gas leakage between the exhaust manifold and the rear HO2S.<br>• Is there gas leakage? | Yes | Repair or replace the malfunctioning faulty exhaust part, then go to Step 13. |
| | | No | Replace sensor, then go to Step 13. |
| 8 | **INSPECT LONG TERM FUEL TRIM**<br>• Access the LONGFT1 PIDs<br>• Compare it with the FREEZE FRAME DATA recorded at Step 1.<br>• Is it below the FFD value? | Yes | The engine is driven under a rich condition. Go to the next step. |
| | | No | The engine is driven under a lean condition. Go to Step 10. |
| 9 | **INSPECT FUEL LINE PRESSURE (Excessive fuel line pressure)**<br>• Turn the ignition switch off.<br>• Inspect the fuel line pressure while the engine is running.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the fuel line pressure normal? | Yes | Go to Step 12. |
| | | No | Inspect fuel pump maximum pressure and fuel return pipe for clogging.<br>(See01-14-13 FUEL PUMP UNIT INSPECTION[L3 WITH TC].)<br>• If there is any problem, repair or replace the parts.<br>• If all items above are normal, replace the fuel pump unit.<br>Then go to Step 13. |
| 10 | **INSPECT FUEL LINE PRESSURE (Low fuel line pressure)**<br>• Turn the ignition switch off.<br>• Inspect the fuel line pressure while the engine is running.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the fuel line pressure normal? | Yes | Go to Step 12. |
| | | No | Go to the next step. |
| 11 | **INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE**<br>• Visually inspect the fuel line for any leakage.<br>• Is there fuel leakage? | Yes | Replace the fuel line, then go to Step 13. |
| | | No | Inspect the fuel filters for the following:<br>• Foreign material or staining inside the fuel filter (low-pressure side)<br>Perform the following actions according to the result.<br>• If foreign material or staining is found inside fuel filter (low-pressure side), clean the fuel tank and filter.<br>• If normal, replace fuel pump unit.<br>Then go to Step 13. |

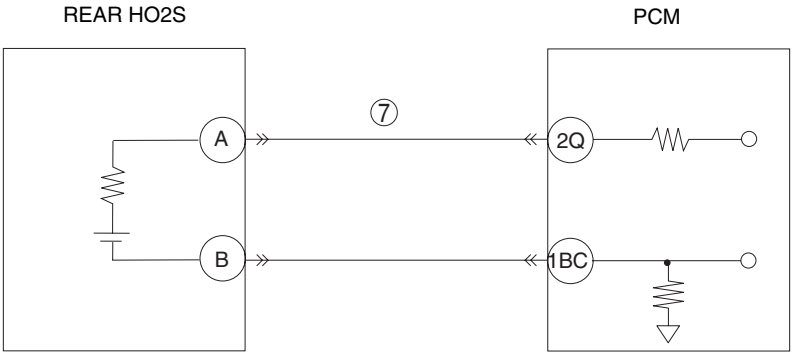
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 12 | **INSPECT SEALING OF ENGINE COOLANT PASSAGE**<br>• Perform the "ENGINE COOLANT LEAKAGE INSPECTION." (See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection results.<br>Then go to the next step. |
| 13 | **VERIFY TROUBLESHOOTING OF DTC P0139 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position. (Engine off)<br>• Clear the DTC from the memory using the M-MDS.<br>• Perform the "PCM Adaptive Memory Produce Drive Mode" and "HO2S heater, HO2S, and TWC Repair Verification Drive Mode". (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 14 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the "AFTER REPAIR PROCEDURE". (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0140[L3 WITH TC]

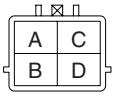
id010239805300

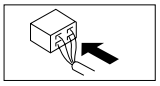
| DTC P0140 | Rear HO2S no activity detected |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input voltage from the rear HO2S when the following conditions are met. Under the following monitoring conditions, if the input voltage from the rear HO2S does not even **exceed 0.55 V** though the short term fuel trim is controlled up to **20.5%** for **9.6 s**, the PCM determines that sensor circuit is not activated.<br>**MONITORING CONDITIONS**<br>— HO2S, HO2S heater and TWC repair verification drive mode<br>— The following conditions are met for **above 20.8 s**.<br>• Engine speed is **above 1,500 rpm**.<br>• Engine coolant temperature is **above 70 °C {158 °F}**.<br>• Rear HO2S voltage is **above0.1V**.<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Rear HO2S deterioration<br>• Rear HO2S heater malfunction<br>• Exhaust system leakage<br>• Open circuit or short to ground in the wiring harness between rear HO2S terminal A and PCM terminal 2Q<br>• Insufficient compression<br>• Engine malfunction |

| DTC P0140 | Rear HO2S no activity detected |
|---|---|




REAR HO2S
WIRING HARNESS-SIDE CONNECTOR

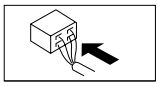


PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

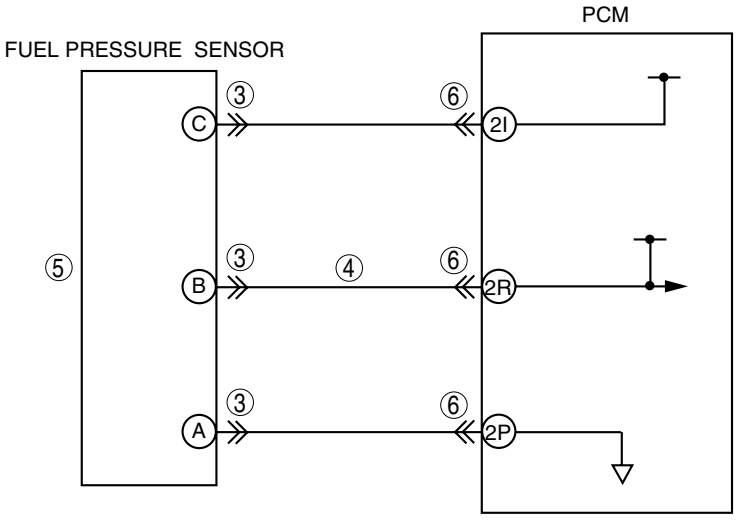
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING AND STORED DTC**<br>**Note**<br>• If the fuel monitor, DTC P0132 is retrieved, ignore it until P0140 is fixed.<br>• Turn the ignition switch off, then to the ON position. (Engine off)<br>• Verify pending and stored DTCs using the M-MDS.<br>• Are other DTCs present? | Yes | Go to the appropriate DTC troubleshooting procedures. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P0140 on the FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for the DTC on the FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Warm up the engine.<br>• Access the O2S12 or the P0140 PID using the M-MDS.<br>• Verify the PID while racing the engine at least **10 times** in NEUTRAL.<br>• Is the PID reading normal?<br>— **More than 0.55 V** at least once during engine racing | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT INSTALLATION OF REAR HO2S**<br>• Check if the rear HO2S is loosely installed.<br>• Is the sensor installed securely? | Yes | Go to the next step. |
| | | No | Install the sensor securely, then go to Step 10. |
| 7 | **INSPECT GAS LEAKAGE FROM EXHAUST SYSTEM**<br>• Visually check if any gas leakage is found between the exhaust pipe and the rear HO2S.<br>• Is there gas leakage? | Yes | Repair or replace any malfunctioning exhaust part, then go to Step 10. |
| | | No | • Inspect the following wiring harness for an open or short to the ground circuit, repair or replace the wiring harness if necessary.<br>— Rear HO2S terminal A (wiring harness-side) to PCM terminal 2Q (wiring harness-side)<br>• Repair or replace the wiring harness if necessary.<br>• If all items above are normal, replace the malfunctioning sensor.<br>Then go to Step 10. |
| 8 | **INSPECT SEALING OF ENGINE COOLANT PASSAGE**<br>• Perform the ENGINE COOLANT LEAKAGE INSPECTION.<br>(See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>• Is the cooling system hold pressure normal? | Yes | Repair or the replace the malfunctioning part according to the inspection result.<br>Then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Perform engine overhaul for repairs, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0140 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position. (Engine off)<br>• Clear the DTC from the memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0192[L3 WITH TC]

id010239805400

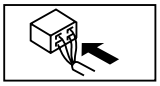
| DTC P0192 | Fuel pressure sensor circuit low input |
|---|---|
| DETECTION CONDITION | • If the input voltage from the fuel pressure sensor is less than **0.19 V** for **1.3 s**, the PCM determines that the fuel pressure sensor circuit is low.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Fuel pressure sensor malfunction<br>• Short to ground in wiring harness between fuel pressure sensor terminal B and PCM terminal 2R<br>• Connector or terminal malfunction<br>• PCM malfunction |

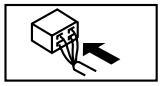



FUEL PRESSURE SENSOR
WIRING HARNESS-SIDE CONNECTOR

PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related service repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

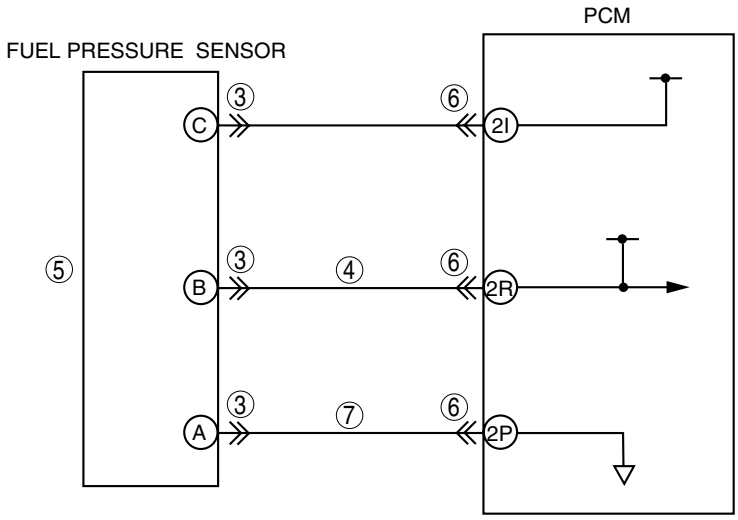
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT FUEL PRESSURE SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fuel pressure sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT FUEL PRESSURE SENSOR SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the fuel pressure sensor terminal B (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the fuel pressure sensor, then go to Step 7. (See01-40-35 FUEL PRESSURE SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0192 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

### DTC P0193[L3 WITH TC]

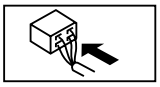
id010239805500

| DTC P0193 | Fuel pressure sensor circuit high input |
|---|---|
| DETECTION CONDITION | • If the input voltage from the fuel pressure sensor is more than **4.8 V** for **1.3 s**, the PCM determines that the fuel pressure sensor circuit is high.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Fuel pressure sensor malfunction<br>• Open circuit in the wiring harness between fuel pressure sensor terminal A and PCM terminal 2P<br>• Short to power in the wiring harness between fuel pressure sensor terminal B and PCM terminal 2R<br>• Connector or terminal malfunction<br>• PCM malfunction |

| DTC P0193 | Fuel pressure sensor circuit high input |
|---|---|

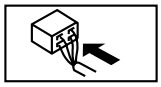



FUEL PRESSURE SENSOR
WIRING HARNESS-SIDE CONNECTOR



PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related service repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL PRESSURE SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fuel pressure sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **INSPECT FUEL PRESSURE SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the fuel pressure sensor terminal B (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to the Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the fuel pressure sensor, then go to Step 8. (See01-40-35 FUEL PRESSURE SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

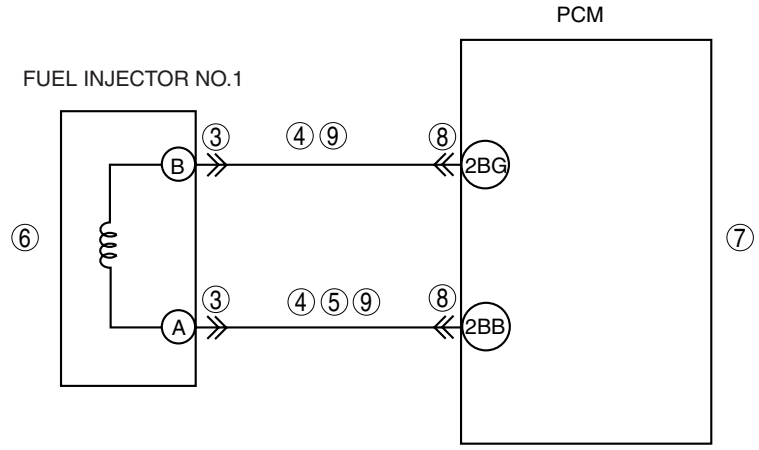
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT FUEL PRESSURE SENSOR CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the fuel pressure sensor terminal A (wiring harness-side) and PCM terminal 2P (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0193 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

**DTC P0201[L3 WITH TC]**

id010239805600

| DTC P0201 | Injector circuit/open cylinder No.1 |
|---|---|
| **DETECTION CONDITION** | • If the fuel injection verification signal is not input at **255 times** continuously even though the PCM drives the fuel injector No.1, the PCM determines that there is an open circuit in the fuel injector No.1 control circuit.<br>**MONITORING CONDITION**<br>— The following conditions are met:<br>• Engine speed: **4,000 rpm or less**<br>• Battery voltage: **10.03 V or more**<br>• Fuel injection control: except during fuel cut<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Fuel injector No.1 malfunction<br>• Connector or terminal malfunction<br>• Open circuit between fuel injector No.1 terminal B and PCM terminal 2BG<br>• Open circuit between fuel injector No.1 terminal A and PCM terminal 2BB<br>• Short to power supply between fuel injector No.1 terminal A and PCM terminal 2BB<br>• Short to ground between fuel injector No.1 terminal B and PCM terminal 2BG<br>• Short to ground between fuel injector No.1 terminal A and PCM terminal 2BB<br>• PCM malfunction |

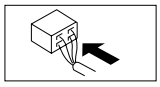
| DTC P0201 | Injector circuit/open cylinder No.1 |
|---|---|

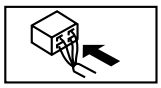



FUEL INJECTOR NO.1
WIRING HARNESS-SIDE CONNECTOR

PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





**Diagnostic procedure**

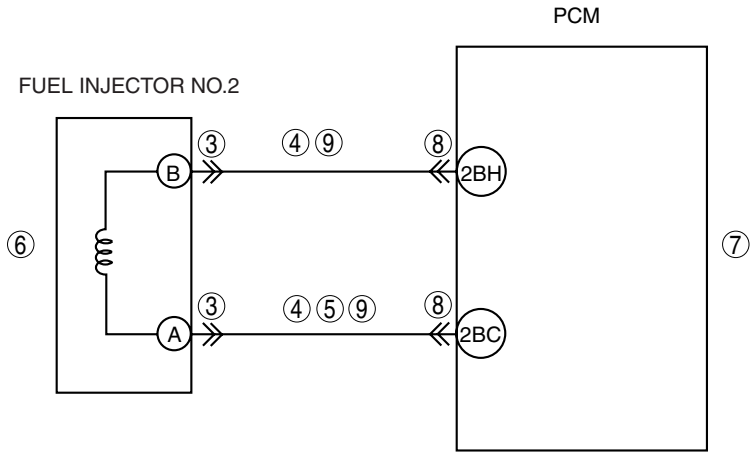
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL INJECTOR NO.1 CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fuel injector No.1 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT FUEL INJECTOR NO.1 CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.1 terminal B (wiring harness-side) and body ground<br>— Fuel injector No.1 terminal A (wiring harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 10. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT FUEL INJECTOR NO.1 CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the fuel injector No.1 terminal A (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 10. |
| | | No | Go to the next step. |
| 6 | **INSPECT FUEL INJECTOR NO.1**<br>• Inspect the fuel injector No.1. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace fuel injector No.1, then go to Step 10. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM**<br>• Inspect the PCM.<br>• Is there malfunction? | Yes | Replace the PCM, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL INJECTOR NO.1 CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.1 terminal B (wiring harness-side) and PCM terminal 2BG (wiring harness-side)<br>— Fuel injector No.1 terminal A (wiring harness-side) and PCM terminal 2BB (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0201 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

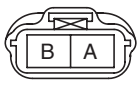
## DTC P0202[L3 WITH TC]

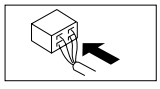
id010239805700

| DTC P0202 | Injector circuit/open cylinder No.2 |
|---|---|
| DETECTION CONDITION | • If the fuel injection verification signal is not input at **255 times** continuously even though the PCM drives the fuel injector No.2, the PCM determines that there is an open circuit in the fuel injector No.2 control circuit.<br>**MONITORING CONDITION**<br>— The following conditions are met:<br>• Engine speed: **4,000 rpm or less**<br>• Battery voltage: **10.03 V or more**<br>• Fuel injection control: except during fuel cut<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Fuel injector No.2 malfunction<br>• Connector or terminal malfunction<br>• Open circuit between fuel injector No.2 terminal B and PCM terminal 2BH<br>• Open circuit between fuel injector No.2 terminal A and PCM terminal 2BC<br>• Short to power supply between fuel injector No.2 terminal A and PCM terminal 2BC<br>• Short to ground between fuel injector No.2 terminal B and PCM terminal 2BH<br>• Short to ground between fuel injector No.2 terminal A and PCM terminal 2BC<br>• PCM malfunction |



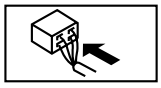

FUEL INJECTOR NO.2
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

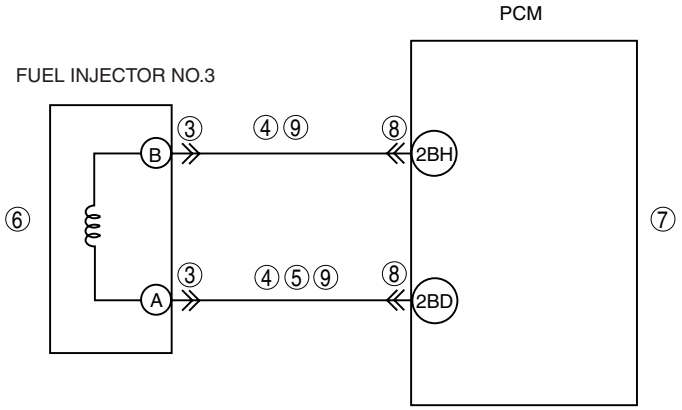
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT FUEL INJECTOR NO.2 CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fuel injector No.2 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT FUEL INJECTOR NO.2 CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.2 terminal B (wiring harness-side) and body ground<br>— Fuel injector No.2 terminal A (wiring harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT FUEL INJECTOR NO.2 CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the fuel injector No.2 terminal A (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 10. |
| | | No | Go to the next step. |
| 6 | **INSPECT FUEL INJECTOR NO.2**<br>• Inspect the fuel injector No.2. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the fuel injector No.2, then go to Step 10. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM**<br>• Inspect the PCM.<br>• Is there malfunction? | Yes | Replace the PCM, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL INJECTOR NO.2 CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.2 terminal B (wiring harness-side) and PCM terminal 2BH (wiring harness-side)<br>— Fuel injector No.2 terminal A (wiring harness-side) and PCM terminal 2BC (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0202 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

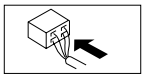
## DTC P0203[L3 WITH TC]

id010239805800

| DTC P0203 | Injector circuit/open cylinder No.3 |
|---|---|
| DETECTION CONDITION | • If the fuel injection verification signal is not input at **255 times** continuously even though the PCM drives fuel injector No.3, the PCM determines that there is an open circuit in the fuel injector No.3 control circuit.<br>**MONITORING CONDITION**<br>— The following conditions are met:<br>• Engine speed: **4,000 rpm or less**<br>• Battery voltage: **10.03 V or more**<br>• Fuel injection control: except during fuel cut<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Fuel injector No.3 malfunction<br>• Connector or terminal malfunction<br>• Open circuit between fuel injector No.3 terminal B and PCM terminal 2BH<br>• Open circuit between fuel injector No.3 terminal A and PCM terminal 2BD<br>• Short to power supply between fuel injector No.3 terminal A and PCM terminal 2BD<br>• Short to ground between fuel injector No.3 terminal B and PCM terminal 2BH<br>• Short to ground between fuel injector No.3 terminal A and PCM terminal 2BD<br>• PCM malfunction |

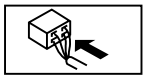



FUEL INJECTOR NO.3
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

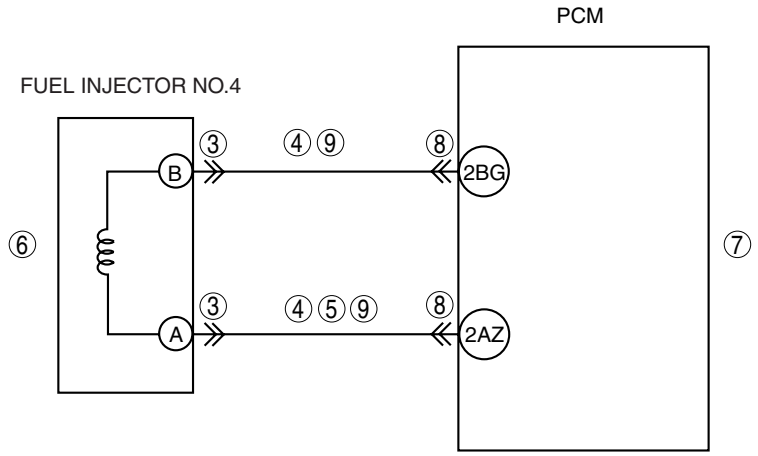
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT FUEL INJECTOR NO.3 CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fuel injector No.3 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT FUEL INJECTOR NO.3 CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.3 terminal B (wiring harness-side) and body ground<br>— Fuel injector No.3 terminal A (wiring harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT FUEL INJECTOR NO.3 CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the fuel injector No.3 terminal A (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 10. |
| | | No | Go to the next step. |
| 6 | **INSPECT FUEL INJECTOR NO.3**<br>• Inspect fuel injector No.3. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace fuel injector No.3, then go to Step 10. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM**<br>• Inspect the PCM.<br>• Is there malfunction? | Yes | Replace the PCM, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL INJECTOR NO.3 CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.3 terminal B (wiring harness-side) and PCM terminal 2BH (wiring harness-side)<br>— Fuel injector No.3 terminal A (wiring harness-side) and PCM terminal 2BD (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0203 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P0204[L3 WITH TC]

id010239805900

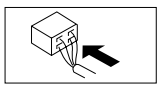
| DTC P0204 | Injector circuit/open cylinder No.4 |
|---|---|
| DETECTION CONDITION | • If the fuel injection verification signal is not input at **255 times** continuously even though the PCM drives fuel injector No.4, the PCM determines that there is an open circuit in the fuel injector No.4 control circuit.<br>**MONITORING CONDITION**<br>— The following conditions are met:<br>• Engine speed: **4,000 rpm or less**<br>• Battery voltage: **10.03 V or more**<br>• Fuel injection control: except during fuel cut<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Fuel injector No.4 malfunction<br>• Connector or terminal malfunction<br>• Open circuit between fuel injector No.4 terminal B and PCM terminal 2BG<br>• Open circuit between fuel injector No.4 terminal A and PCM terminal 2AZ<br>• Short to power supply between fuel injector No.4 terminal A and PCM terminal 2AZ<br>• Short to ground between fuel injector No.4 terminal B and PCM terminal 2BG<br>• Short to ground between fuel injector No.4 terminal A and PCM terminal 2AZ<br>• PCM malfunction |

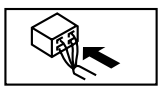



FUEL INJECTOR NO.4
WIRING HARNESS-SIDE CONNECTOR

PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

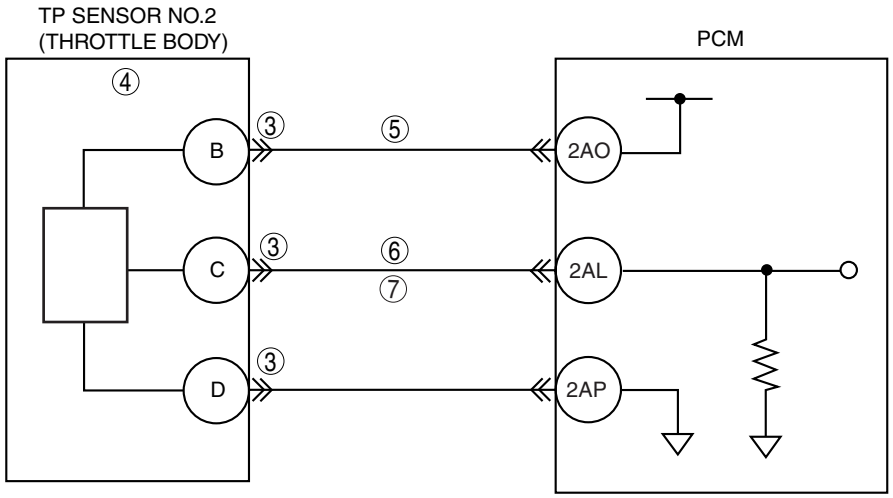
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT FUEL INJECTOR NO.4 CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fuel injector No.4 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT FUEL INJECTOR NO.4 CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.4 terminal B (wiring harness-side) and body ground<br>— Fuel injector No.4 terminal A (wiring harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT FUEL INJECTOR NO.4 CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the fuel injector No.4 terminal A (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to Step 10. |
| | | No | Go to the next step. |
| 6 | **INSPECT FUEL INJECTOR NO.4**<br>• Inspect fuel injector No.4. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace fuel injector No.4, then go to Step 10. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM**<br>• Inspect the PCM.<br>• Is there any malfunction? | Yes | Replace the PCM, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL INJECTOR NO.4 CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Fuel injector No.4 terminal B (wiring harness-side) and PCM terminal 2BG (wiring harness-side)<br>— Fuel injector No.4 terminal A (wiring harness-side) and PCM terminal 2AZ (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0204 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

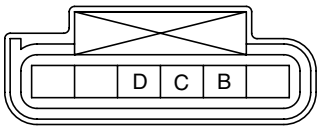
## DTC P0222[L3 WITH TC]

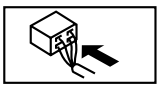
id010239806000

| DTC P0222 | TP sensor No.2 circuit low input |
|---|---|
| DETECTION CONDITION | • If PCM detects that the TP sensor No.2 voltage is **below 0.2 V** after the ignition switch to the ON position, the PCM determines that TP circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • TP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between throttle body terminal C and PCM terminal 2AL<br>• Short to ground between throttle body terminal C and PCM terminal 2AL<br>• Open circuit between throttle body terminal B and PCM terminal 2AO<br>• Short to ground between throttle body terminal B and PCM terminal 2AO<br>• PCM malfunction |



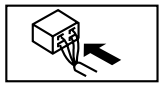

THROTTLE BODY
HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

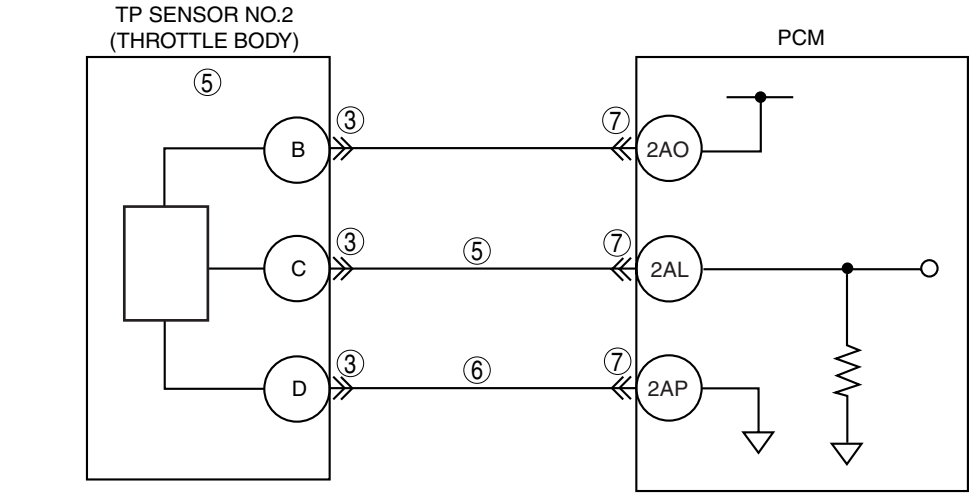
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT TP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the TP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY TP SENSOR OR HARNESS MALFUNCTION**<br>• Connect the M-MDS.<br>• Access the TP2 PID.<br>• Disconnect the throttle body connector.<br>• Connect a jumper wire between throttle body terminals B and C (harness-side).<br>• Is the voltage**above 4.9 V?** | Yes | Go to the next step. |
| | | No | Go to step 5. |
| 4 | **INSPECT TP SENSOR**<br>• Perform the TP sensor inspection. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the TP sensor normal? | Yes | Inspect throttle body connector terminal B connection for poor connection. Repair or replace if necessary, then go to Step 8. |
| | | No | Replace throttle body, then go to Step 8. |
| 5 | **INSPECT POWER SUPPLY CIRCUIT VOLTAGE AT THROTTLE BODY CONNECTOR**<br>**Note**<br>• If DTC P0107 and P2228 are also retrieved with P0122, go to the CONSTANT VOLTAGE troubleshooting procedure.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage at throttle body terminal B (harness-side).<br>• Is the voltage**within 4.5— 5.5 V?** | Yes | Go to the next step. |
| | | No | Repair or replace for an open circuit between throttle body connector terminal B and PCM connector terminal 2AO (harness-side).<br>Then, then go to Step 8. |
| 6 | **INSPECT TP2 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between throttle body terminal C (harness-side) and PCM terminal 2AL.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 8. |
| 7 | **INSPECT TP2 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between throttle body terminal C (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0222 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS–2.3— 5.0 kPa {–0.023— 0.05 kgf/ $cm^2$, –0.34— 0.72 psi}.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

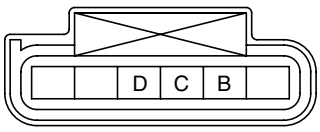
## DTC P0223[L3 WITH TC]

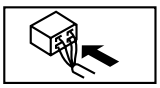
id010239806100

| DTC P0223 | TP sensor No.2 circuit high input |
|---|---|
| DETECTION CONDITION | • If the PCM detects that the TP sensor No.2 voltage is **above 4.85 V** after the ignition switch to the ON position, the PCM determines that the TP circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • TP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between throttle body terminal D and PCM terminal 2AP<br>• Short to power supply between throttle body terminal C and PCM terminal 2AL<br>• PCM malfunction |



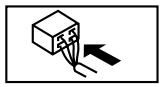

THROTTLE BODY
HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT THROTTLE BODY CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the throttle body connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the suspected terminal, then go to Step 8. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT TP SENSOR**<br>• Perform the TP sensor inspection. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC])<br>• Is the TP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to Step 8. |
| 5 | **INSPECT TP2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between throttle body terminal C (harness-side) and body ground.<br>• Is the voltage **above 4.9 V?** | Yes | Repair or replace for a short to a power supply. Then, go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT TP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between throttle body connector terminal D (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace for an open circuit between throttle body terminal D (harness-side) and PCM connector terminal 2AP (harness-side). Then, go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0223 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0234[L3 WITH TC]

id010239806200

| DTC P0234 | Turbocharger over boost condition |
|---|---|
| DETECTION CONDITION | • If the manifold absolute pressure or charging efficiency are more than the specification for the specified period of time, the PCM determines that the turbocharger is in an over boost condition.<br>**MONITORING CONDITIONS**<br>— Engine speed is **2,000 rpm or more**.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Wastegate control solenoid valve malfunction<br>• Vacuum hose looseness or damage<br>• Improper installation of the vacuum hose |



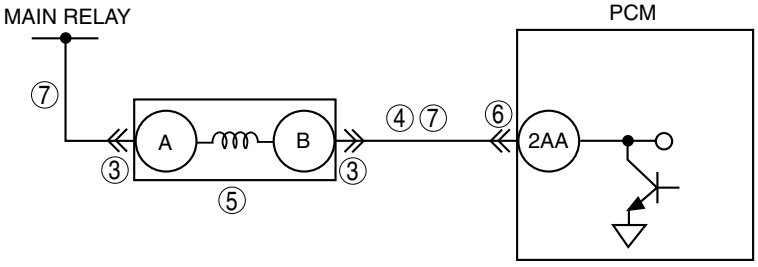
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE**<br>• Inspect the wastegate control solenoid valve. (See01-13-14 WASTEGATE CONTROL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the wastegate control solenoid valve, then go to Step 5.<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT VACUUM HOSE**<br>• Inspect the vacuum hose condition for the following:<br>— Looseness<br>— Damage<br>— Improper installation<br>• Is there any malfunction? | Yes | Repair or replace the suspected part, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0234 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

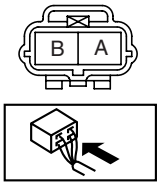
## DTC P0245[L3 WITH TC]

id010239806300

| DTC P0245 | Turbocharger wastegate solenoid low |
|---|---|
| DETECTION CONDITION | • When the PCM turns the wastegate control solenoid valve off but the wastegate control solenoid valve circuit voltage is low, the PCM determines that the wastegate control solenoid valve control circuit voltage is low.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Wastegate control solenoid valve malfunction<br>• Connector or terminal malfunction<br>• Open circuit in the wiring harness between wastegate control solenoid valve terminal A and main relay<br>• Open circuit in the wiring harness between wastegate control solenoid valve terminal B and PCM terminal 2AA<br>• Short to ground in the wiring harness between wastegate control solenoid valve terminal B and PCM terminal 2AA<br>• PCM malfunction |

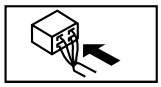



WASTEGATE CONTROL SOLENOID VALVE WIRING HARNESS-SIDE CONNECTOR




PCM WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



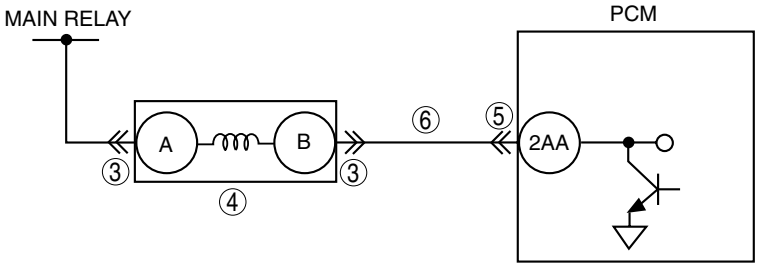
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the wastegate control solenoid valve connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the wastegate control solenoid valve terminal B and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground, then go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE**<br>• Inspect the wastegate control solenoid valve. (See01-13-14 WASTEGATE CONTROL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the wastegate control solenoid valve, then go to Step 8.<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals:<br>— Wastegate control solenoid valve terminal A (wiring harness-side) and main relay<br>— Wastegate control solenoid valve terminal B (wiring harness-side) and PCM terminal 2AA (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0245 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

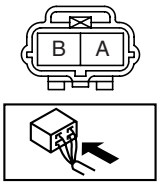
## DTC P0246[L3 WITH TC]

id010239806400

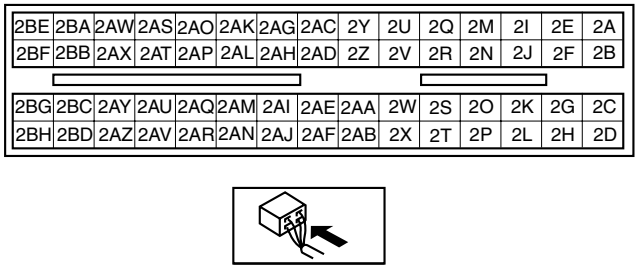
| DTC P0246 | Turbocharger wastegate solenoid high |
|---|---|
| DETECTION CONDITION | • When the PCM turns the wastegate control solenoid valve on but the wastegate control solenoid valve circuit voltage is high, the PCM determines that the wastegate control solenoid valve control circuit voltage is high.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Wastegate control solenoid valve malfunction<br>• Connector or terminal malfunction<br>• Short to power supply in the wiring harness between wastegate control solenoid valve terminal B and PCM terminal 2AA<br>• PCM malfunction |




WASTEGATE CONTROL SOLENOID VALVE WIRING HARNESS-SIDE CONNECTOR




PCM WIRING HARNESS-SIDE CONNECTOR




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the wastegate control solenoid valve connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE**<br>• Inspect the wastegate control solenoid valve. (See01-13-14 WASTEGATE CONTROL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the wastegate control solenoid valve, then go to Step 7.<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT WASTEGATE CONTROL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position.<br>• Inspect for continuity between the wastegate control solenoid valve terminal B (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a possible short to power supply, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0246 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

### DTC P0300[L3 WITH TC]

id010239806500

| DTC P0300 | Random misfire detected |
|---|---|
| DETECTION CONDITION | • The PCM monitors the CKP sensor input signal interval time. The PCM calculates the change of interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates a misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred.<br>**Diagnostic support note**<br>• This is a continuous monitor (Misfire).<br>• The MIL illuminates if the PCM detects a misfire which affects emission performance in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• The MIL flashes if the PCM detects a misfire which can damage the catalytic converter during the first drive cycle.<br>• PENDING CODE is available if the PCM detects a misfire which affects emission performance during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTC is stored in the PCM memory. |

| DTC P0300 | Random misfire detected |
|---|---|
| POSSIBLE CAUSE | • CKP sensor malfunction<br>• CMP sensor malfunction<br>• Ignition coil malfunction<br>• Ignition system malfunction<br>• MAF sensor contamination<br>• Excess air suction in intake air system (between MAF sensor and intake manifold)<br>• Fuel pump malfunction<br>• High pressure fuel pump malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• Improper fuel pump speed control operation<br>• Fuel pressure regulator (built-in fuel pump unit) malfunction<br>• Fuel line clogged<br>• Fuel filter clogged<br>• Fuel leakage in fuel line<br>• Fuel runout<br>• Poor quality fuel<br>• Purge control solenoid valve malfunction<br>• PCV valve malfunction<br>• EGR valve malfunction<br>• Vacuum hoses damage or improper connection<br>• Related connector and terminal malfunction<br>• Related wiring harness malfunction<br>• Insufficient compression<br>• Variable valve timing control system improper |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Misfire related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | Go to the appropriate DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY CURRENT INPUT SIGNAL STATUS (KEY TO ON/IDLE)**<br>• Access APP1, APP2, ECT, IAT, MAF, RPM, TP, and VSS PIDs using the M-MDS. (See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>• Is there any signal that is far out of specification when the ignition switch is turned to the ON position and the engine idles? | Yes | Inspect the suspected circuit and/or part according to the inspection results. (See01-40-6 PCM INSPECTION[L3 WITH TC].) Then go to Step 26. |
| | | No | Go to the next step. |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION**<br>• Inspect the same PIDs as in Step 4 while simulating FREEZE FRAME DATA condition.<br>• Is there any signal which causes drastic changes? | Yes | Inspect the suspected circuit and/or part according to the inspection results. (See01-40-6 PCM INSPECTION[L3 WITH TC].) Then go to Step 26. |
| | | No | Go to the next step. |
| 6 | **INSPECT CMP SENSOR**<br>• Inspect the CMP sensor. (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the CMP sensor normal? | Yes | Go to the next step. |
| | | No | Inspect the installation condition for damage to the timing chain and gears, repair the malfunctioning part.<br>• If it is normal, replace the CMP sensor.<br>Then go to Step 26. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **VERIFY CKP SENSOR INSTALLATION CONDITION**<br>• Inspect the CKP sensor for looseness.<br>• Is the CKP sensor loose? | Yes | Retighten the CKP sensor, then go to Step. |
| | | No | Go to the next step. |
| 8 | **INSPECT IGNITION COIL HARNESSES**<br>• Inspect the ignition coil related wiring harness condition (intermittent open or short) for all cylinders.<br>• Are wiring harness conditions normal? | Yes | Go to the next step. |
| | | No | Repair the suspected wiring harnesses, then go to Step 26. |
| 9 | **INSPECT IGNITION SYSTEM OPERATION**<br>• Carry the out spark test. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC])<br>• Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to the spark test result.<br>Then go to Step 26. |
| 10 | **INSPECT MAF PID**<br>• Start the engine.<br>• Access the MAF PID using the M-MDS.<br>• Race the engine and verify that the MAF PID changes quickly according to the change in the engine speed.<br>• Is the MAF PID response normal? | Yes | Go to the next step. |
| | | No | Replace the MAF sensor, then go to Step 26. |
| 11 | **INSPECT IN INTAKE AIR SYSTEM FOR EXCESSIVE AIR SUCTION**<br>• Inspect for air leakage at the following:<br>— Between the MAF sensor and throttle body<br>— Between throttle body and intake manifold<br>• Is there any malfunction? | Yes | Repair or replace suspected part, then go to Step 26. |
| | | No | Go to the next step. |
| 12 | **INSPECT FUEL LINE PRESSURE**<br>• Inspect fuel line pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the fuel line pressure normal? | Yes | Go to Step 14. |
| | | No | If the fuel line pressure is too low, go to the next step.<br>If the fuel line pressure is too high, replace the fuel pump unit,<br>then go to Step 26. |
| 13 | **INSPECT FUEL LINE FROM FUEL PUMP TO FUEL DELIVERY PIPE**<br>• Visually inspect fuel line for fuel leakage.<br>• Is there any fuel leakage? | Yes | Replace suspected fuel line, then go to Step 20. |
| | | No | Inspect the fuel filters for following:<br>• Foreign material or stain inside fuel filter (low-pressure side)<br>Perform following actions depend on the result above.<br>• If foreign materials or stain is found inside fuel filter (low-pressure side), clean the fuel tank and filter (low-pressure side).<br>• If normal, replace the fuel pump unit.<br>Then, go to Step 26. |
| 14 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression. (See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Perform engine overhaul for repairs, then go to Step 26. |
| 15 | **INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION**<br>• Inspect variable valve timing control system operation. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC])<br>• Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to the variable valve timing control system inspection results, then go to Step 26. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 16 | **INSPECT OPERATION OF PURGE CONTROL SOLENOID VALVE**<br>• Turn the ignition switch off.<br>• Connect the vacuum pump to the purge control solenoid valve and apply vacuum to the solenoid.<br>• Verify that the solenoid holds vacuum.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Access EVAPCP PID in the SIMULATION TEST using the M-MDS.<br>• Set duty value to **100%** for the EVAPCP PID.<br>• Apply vacuum while turning the solenoid from OFF to ON and simulating the EVAPCP PID with a **100%** duty value.<br>• Verify that the solenoid releases vacuum while the solenoid is turned on.<br>• Is the purge control solenoid valve operation normal? | Yes | Go to the next step. |
| | | No | Replace the purge control solenoid valve, then go to Step 26. |
| 17 | **INSPECT PCV VALVE OPERATION**<br>• Turn the ignition switch off.<br>• Remove the PCV valve and inspect the valve operation.<br>(See01-16-14 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION[L3 WITH TC].)<br>• Is the PCV valve operation normal? | Yes | Replace the PCV valve, then go to Step 26. |
| | | No | Go to the next step. |
| 18 | **INSPECT OPERATION OF EGR VALVE**<br>• Remove the EGR valve.<br>• Visually inspect the if EGR valve is stuck open.<br>• Is the EGR valve stuck open? | Yes | Repair or replace the EGR valve, then go to Step 26. |
| | | No | Go to the next step. |
| 19 | **VERIFY FUEL PUMP SPEED CONTROL OPERATION**<br>• Perform Fuel Pump Speed Control Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the fuel pump speed control work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to inspection results.<br>Then go to Step 26. |
| 20 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor the FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 24. |
| | | No | Go to the next step. |
| 21 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 23. |
| 22 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the fuel delivery pipe, then go to Step 26. |
| 23 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 26. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 24 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following.<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump.Then go to Step 26. |
| 25 | **INSPECT SEALING OF ENGINE COOLANT PASSAGE**<br>• Perform “ENGINE COOLANT LEAKAGE INSPECTION.” (See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part according to the inspection results.<br>Then go to the next step. |
| | | No | Go to the next step. |
| 26 | **VERIFY TROUBLESHOOTING OF MISFIRE DTC COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 27 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0301, P0302, P0303, P0304[L3 WITH TC]

id010239806600

| | |
|---|---|
| **DTC P0301**<br>**DTC P0302**<br>**DTC P0303**<br>**DTC P0304** | **Cylinder No.1 misfire detected**<br>**Cylinder No.2 misfire detected**<br>**Cylinder No.3 misfire detected**<br>**Cylinder No.4 misfire detected** |
| **DETECTION CONDITION** | • The PCM monitors the CKP sensor input signal interval time. The PCM calculates the change of interval time for each cylinder. If the change of interval time exceeds the preprogrammed criteria, the PCM detects a misfire in the corresponding cylinder. While the engine is running, the PCM counts the number of misfires that occurred at **200 crankshaft revolutions** and **1,000 crankshaft revolutions** and calculates a misfire ratio for each crankshaft revolution. If the ratio exceeds the preprogrammed criteria, the PCM determines that a misfire, which can damage the catalytic converter or affect emission performance, has occurred.<br>**Diagnostic support note**<br>• This is a continuous monitor (Misfire).<br>• The MIL illuminates if the PCM detects a misfire which affects emission performance in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• The MIL flashes if the PCM detects a misfire which can damage the catalytic converter during the first drive cycle.<br>• PENDING CODE is available if the PCM detects a misfire which affects emission performance during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Spark plug malfunction<br>• Ignition coil malfunction<br>• Ignition system malfunction<br>• Fuel injector malfunction<br>• Air suction in intake air system (between dynamic chamber and cylinder head)<br>• Inadequate engine compression due to engine internal malfunction<br>• Related connector or terminal malfunction<br>• Related wiring harness |

**Diagnostic procedure**

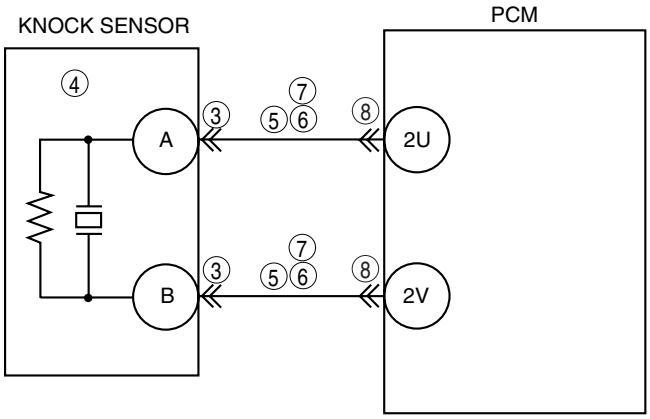
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Misfire related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCs**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | Go to the appropriate DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY CURRENT INPUT SIGNAL STATUS (KEY TO ON /IDLE)**<br>• Access APP1, APP2, ECT, IAT, MAF, RPM, TP and VSS PIDs using the M-MDS. (See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>• Is there any signal that is far out of specification when the ignition switch is turned to the ON position and the engine idles? | Yes | Inspect the suspected circuit and/or part according to inspection results. Then go to Step 14. (See01-40-6 PCM INSPECTION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION**<br>• Inspect the same PIDs as in Step 4 while simulating the FREEZE FRAME DATA condition.<br>• Is there any signal which causes drastic changes? | Yes | Inspect the suspected circuit and/or part according to inspection results. Then go to Step 14. (See01-40-6 PCM INSPECTION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **INSPECT SPARK PLUG CONDITION**<br>• Turn the ignition switch off.<br>• Remove the spark plug from the suspected cylinder.<br>• Inspect the spark plug condition:<br>— Cracks<br>— Excess wear<br>— Gap<br>— Wetness<br>• Is there any problem found on the spark plug? | Yes | • If a spark plug is wet, fuel flooding is suspected. Then go to Step 14.<br>• If a spark plug has cracks, excessive wear or an improper gap, replace the malfunctioning spark plug. Then go to Step 14. |
| | | No | Go to the next step. |
| 7 | **INSPECT INTAKE-AIR SYSTEM FOR AIR SUCTION**<br>• Inspect for air leakage at the following:<br>— Around connection of dynamic chamber and intake manifold<br>— Around connection of intake manifold and cylinder head<br>• Is air leakage found? | Yes | Repair or replace suspected part, then go to Step 14. |
| | | No | Go to the next step. |
| 8 | **INSPECT SEALING OF ENGINE COOLANT PASSAGE**<br>• Perform “ENGINE COOLANT LEAKAGE INSPECTION.” (See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part according to the inspection results. Then go to Step 14. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | **INSPECT FUEL INJECTOR WIRING HARNESS**<br>• Remove the intake air system parts.<br>• Disconnect the fuel injector connector on suspected cylinder.<br>• Connect the NOID LIGHT to the fuel injector terminals.<br>• Inspect the light dim during cranking.<br>• Does the light not illuminate? | Yes | Go to the next step. |
| | | No | Inspect the fuel injector wiring harnesses.<br>Repair or replace if necessary, then go to Step 14. |
| 10 | **INSPECT IGNITION COIL HARNESSES**<br>• Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) of the suspected cylinder.<br>• Are the wiring harness conditions normal? | Yes | Go to the next step. |
| | | No | Repair the suspected wiring harnesses, then go to Step 14. |
| 11 | **INSPECT IGNITION SYSTEM OPERATION**<br>• Carry out the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC])<br>• Is a strong blue spark visible at the suspected cylinder? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to the spark test result.<br>Then go to Step 14. |
| 12 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is the engine compression normal? | Yes | Go to the next step. |
| | | No | Overhaul the engine, then go to the next step. |
| 13 | **INSPECT FUEL INJECTOR OPERATION**<br>• Connect the M-MDS to DLC-2.<br>• Access INJ#1, INJ#2, INJ#3, INJ#4 PIDs.<br>• Start the engine and warm it up to the normal operating temperature.<br>• Turn the fuel injector off from on using the PID simulation function.<br>• Does the engine speed decrease while the fuel injectors are turned off? | Yes | Go to Step 14. |
| | | No | Go to the next step. |
| 14 | **VERIFY IF TROUBLESHOOTING OF MISFIRE DTC COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Start the engine.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 15 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

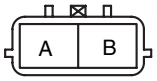
## DTC P0327[L3 WITH TC]

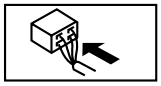
id010239806700

| DTC P0327 | Knock sensor circuit low input |
|---|---|
| DETECTION CONDITION | • PCM monitors the input signal from the knock sensor when the engine is running. If the input voltage at the PCM terminals between 2V and 2U is **below 0.12 V**, the PCM determines that the knock sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Knock sensor malfunction<br>• Connector or terminal malfunction<br>• Open or short to ground circuit between knock sensor connector terminal A and PCM terminal 2U<br>• Open or short to ground circuit between knock sensor connector terminal B and PCM terminal 2V<br>• Knock sensor wires (2) shorted<br>• PCM malfunction |



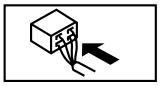

KNOCK SENSOR
WIRING HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

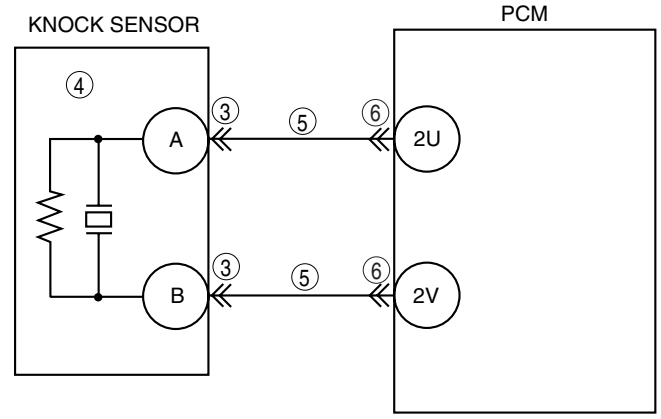
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT KNOCK SENSOR CONNECTOR TERMINAL FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the knock sensor connector.<br>• Check for poor connection at terminals A and B (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 9. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT KNOCK SENSOR**<br>• Perform the knock sensor inspection. (See01-40-47 KNOCK SENSOR (KS) INSPECTION[L3 WITH TC])<br>• Is the knock sensor normal? | Yes | Go to the next step. |
| | | No | Replace the knock sensor, then go to the next step. |
| 5 | **INSPECT KNOCK SENSOR CIRCUITS FOR OPEN CIRCUIT**<br>• Disconnect the knock sensor connector.<br>• Inspect the continuity between the following circuits:<br>— Knock sensor female terminal A (harness-side) and PCM terminal 2U (harness-side)<br>— Knock sensor female terminal B (harness-side) and PCM terminal 2V (harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 9. |
| 6 | **INSPECT KNOCK SENSOR CIRCUITS FOR SHORT TO GROUND**<br>• Inspect the continuity between the following circuits:<br>— Knock sensor female terminal A (harness-side) and body ground<br>— Knock sensor female terminal B (harness-side) and body ground<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT FOR SHORT CIRCUITS**<br>• Inspect for continuity between knock sensor female terminals A and B (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR TERMINAL FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection at terminals 2V and 2U (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0327 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

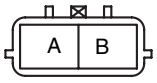
## DTC P0328[L3 WITH TC]

id010239806800

| DTC P0328 | Knock sensor circuit high input |
|---|---|
| DETECTION CONDITION | • PCM monitors the input signal from the knock sensor when the engine is running. If the input voltage at the PCM terminals between 2V and 2U is **below 4.9 V**, the PCM determines that the knock sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Knock sensor malfunction<br>• Connector or terminal malfunction<br>• Short to the power supply in the wiring harness between knock sensor terminal A and PCM terminal 2U<br>• Short to the power supply in the wiring harness between knock sensor terminal B and PCM terminal 2V<br>• PCM malfunction |

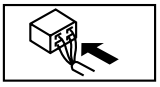


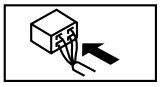

KNOCK SENSOR
WIRING HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





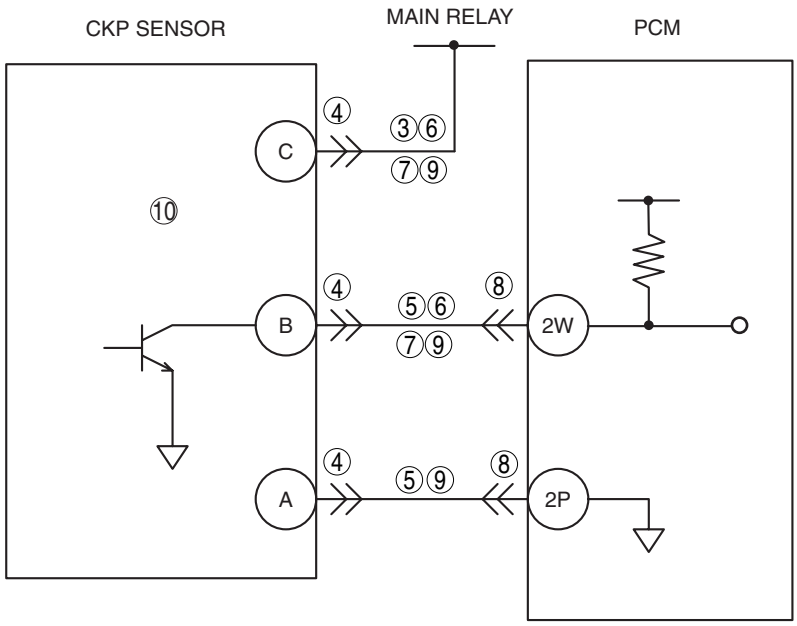
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT KNOCK SENSOR CONNECTOR TERMINAL FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the knock sensor connector.<br>• Inspect for poor connection at terminals A and B (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT KNOCK SENSOR**<br>• Perform the knock sensor inspection. (See01-40-47 KNOCK SENSOR (KS) INSPECTION[L3 WITH TC])<br>• Is the knock sensor normal? | Yes | Go to the next step. |
| | | No | Replace the knock sensor, then go to step 7. |
| 5 | **INSPECT KNOCK SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between knock sensor terminal A (harness-side) and body ground and knock sensor terminal B (harness-side) and body ground.<br>• Is there any voltage? | Yes | Repair or replace the wiring harness for a short to the power supply, then go to step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0328 COMPLETED**<br>• Make sure to connect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

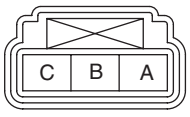
## DTC P0335[L3 WITH TC]

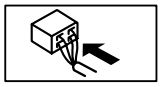
id010239806900

| DTC P0335 | CKP sensor circuit malfunction |
|---|---|
| DETECTION CONDITION | • If the PCM does not receive the input voltage from the CKP sensor for **4.2 s** while the MAF is **2.0 g/s {0.26 lb/min.} or above**, the PCM determines that the CKP sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • CKP sensor malfunction<br>• Connector or terminal malfunction<br>• CKP sensor is dirty.<br>• Short to the power supply between CKP sensor terminal A and PCM terminal 2P<br>• Short to the power supply between CKP sensor terminal B and PCM terminal 2W<br>• Short to ground between CKP sensor terminal C and main relay<br>• Short to ground between CKP sensor terminal B and PCM terminal 2W<br>• Open circuit between CKP sensor terminal A and PCM terminal 2P<br>• Open circuit between CKP sensor terminal B and PCM terminal 2W<br>• Open circuit between CKP sensor terminal C and main relay<br>• CKP sensor pulse wheel malfunction<br>• Both CKP sensor wires are shorted to each other<br>• PCM malfunction |



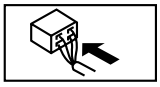

CKP SENSOR
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available the repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY CKP SENSOR VOLTAGE**<br>• Disconnect the CKP sensor connector.<br>• Connect the voltmeter between the CKP sensor connector terminals B and C (sensor-side).<br>• Inspect the voltage in the AC range while cranking the engine.<br>• Is there any voltage? | Yes | Go to the next step. |
| | | No | Go to step 10. |
| 4 | **INSPECT CKP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Verify that the CKP sensor connector is connected securely.<br>• Is connector normal? | Yes | Go to the next step. |
| | | No | Reconnect the connector, then go to Step 11. |
| 5 | **INSPECT CKP CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch OFF<br>• Disconnect the CKP sensor connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between following terminals (harness-side):<br>— CKP sensor terminal A<br>— CKP sensor terminal B<br>• Is there any voltage? | Yes | Repair or replace the suspected wiring harness, then go to Step 11. |
| | | No | Go to the next step. |
| 6 | **INSPECT CKP CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between following terminal and body ground:<br>— CKP sensor connector terminal C (harness-side)<br>— CKP sensor connector terminal B (harness-side)<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 11. |
| | | No | Go to the next step. |
| 7 | **INSPECT CKP CIRCUITS FOR SHORT CIRCUIT**<br>• Inspect for continuity between CKP sensor connector terminals B and C (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 11. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 11. |
| | | No | Go to the next step. |
| 9 | **INSPECT CKP CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between the following circuits:<br>— CKP sensor terminal A (harness-side) and PCM terminal 2P (harness-side)<br>— CKP sensor terminal B (harness-side) and PCM terminal 2W (harness-side)<br>— CKP sensor terminal C (harness-side) and main relay<br>• Are there continuity? | Yes | Go to Step 11. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 11. |

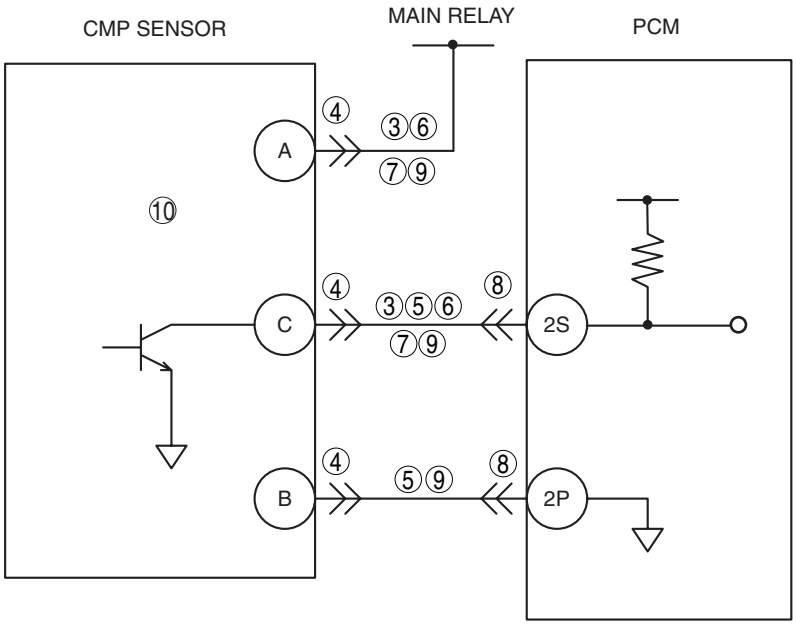
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **INSPECT CKP SENSOR**<br>• Turn the ignition switch off.<br>• Perform the CKP sensor inspection. (See01-40-43 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION[L3 WITH TC])<br>• Is the CKP sensor normal? | Yes | Go to the next step. |
| | | No | Inspect the CKP sensor pulse wheel for damage. Replace the CKP sensor pulse wheel and go to the next step. |
| 11 | **VERIFY TROUBLESHOOTING OF DTC P0335 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Access the MAF PID using the M-MDS.<br>**Note**<br>• The MAF PID should indicate **2.0 g/s {0.26 lb/min.} or above** during this test<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 12 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

**DTC P0340[L3 WITH TC]**

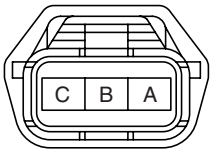
id010239807000

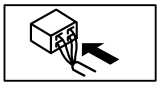
| DTC P0340 | Camshaft position (CMP) sensor circuit malfunction |
|---|---|
| **DETECTION CONDITION** | • PCM monitors the input voltage from the CMP sensor when engine is running. If the PCM does not receive the input voltage from the CMP sensor while the PCM receives the input signal from the CKP sensor, the PCM determines that the CMP circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • CMP sensor malfunction<br>• Connector or terminal malfunction<br>• CMP sensor is dirty<br>• Short to the power circuit between CMP sensor terminal C and PCM terminal 2S<br>• Short to the power circuit between CMP sensor terminal B and PCM terminal 2P<br>• Short to ground circuit between CMP sensor terminal A and main relay<br>• Short to ground circuit between CMP sensor terminal C and PCM terminal 2S<br>• Open circuit between CMP sensor terminal A and main relay<br>• Open circuit between CMP sensor terminal B and PCM terminal 2P<br>• Open circuit between CMP sensor terminal C and PCM terminal 2S<br>• Both CMP sensor wires are shorted to each other<br>• CMP sensor pulse wheel malfunction<br>• CMP sensor misinstallation<br>• Timing chain misinstallation<br>• Loose timing chain or improper valve timing<br>• Loose camshaft sprocket lock bolt<br>• Loose crankshaft pulley lock bolt<br>• PCM malfunction |

| DTC P0340 | Camshaft position (CMP) sensor circuit malfunction |
|---|---|



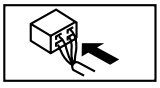

CMP SENSOR
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY CMP SENSOR VOLTAGE**<br>• Disconnect the CMP sensor connector.<br>• Connect a voltmeter between CMP sensor connector terminals A and C (sensor-side).<br>• Inspect the voltage in AC range while cranking the engine.<br>• Is there any voltage? | Yes | Go to the next step. |
| | | No | Go to step 10. |
| 4 | **INSPECT CMP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Verify that the CMP sensor connector is connected securely.<br>• Is the connector normal? | Yes | Go to the next step. |
| | | No | Reconnect the connector, then go to Step 15. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT CMP CIRCUIT FOR SHORT TO POWER**<br>• Turn ignition switch OFF.<br>• Disconnect the CMP sensor connector.<br>• Turn ignition switch to the ON position (Engine off)<br>• Measure voltage between the following terminals:<br>— CMP sensor connector terminal C (harness-side) and body ground<br>— CMP sensor connector terminal B (harness-side) and body ground<br>• Is the voltage **B+**? | Yes | Repair or replace the suspected wiring harness, then go to Step 15. |
| | | No | Go to the next step. |
| 6 | **INSPECT CMP CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between the following terminal and body ground:<br>— CMP sensor connector terminal A (harness-side)<br>— CMP sensor connector terminal C (harness-side)<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 15. |
| | | No | Go to the next step. |
| 7 | **INSPECT CMP CIRCUITS FOR SHORT CIRCUIT**<br>• Inspect for continuity between CMP sensor connector terminals A and C (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to Step 15. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged, pulled-out terminals, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 15. |
| | | No | Go to the next step. |
| 9 | **INSPECT CMP CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between the following circuits:<br>— CMP sensor terminal A (harness-side) and main relay<br>— CMP sensor terminal B (harness-side) and PCM terminal 2P (harness-side)<br>— CMP sensor terminal C (harness-side) and PCM terminal 2S (harness-side)<br>• Is there continuity? | Yes | Go to Step 11. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 15. |
| 10 | **INSPECT CMP SENSOR**<br>• Turn the ignition switch off.<br>• Perform the CMP sensor inspection. (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the CMP sensor normal? | Yes | Go to the Step 15. |
| | | No | Replace the CMP sensor and go to Step 15. |
| 11 | **VERIFY CMP SENSOR INSTALLATION**<br>• Verify the CKP sensor installation. (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>• Is the CMP sensor installed correctly? | Yes | Go to the next step. |
| | | No | Reinstall the CKP sensor and go to Step 15. |
| 12 | **VERIFY VALVE TIMING MECHANISM INSTALLATION**<br>• Verify the valve timing mechanism installation for the following parts:<br>— Timing chain misinstallation<br>— Loose camshaft sprocket lock bolt<br>— Loose crankshaft pulley lock bolt<br>• Is the valve timing mechanism installed correctly? | Yes | Go to the next step. |
| | | No | Reinstall the following parts and go to Step 15.<br>• Timing chain<br>• Camshaft sprocket<br>• Crankshaft pulley |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 13 | **INSPECT STOPPER PIN MECHANISM**<br>• Remove the timing chain.<br>• Inspect the stopper pin. (See01-10-27 VARIABLE VALVE TIMING ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is the stopper pin mechanism normal? | Yes | Go to the next step. |
| | | No | Replace the variable valve timing actuator, then go to Step 15. |
| 14 | **INSPECT ROTOR POSITION**<br>• Remove the variable valve timing actuator. (See01-10-28 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION[L3 WITH TC])<br>• Is the rotor position at the maximum valve timing retard? | Yes | **VARIABLE VALVE TIMING MECHANISM NORMAL**<br>**Note**<br>• This DTC is detected as an intermittent concern.<br>• The intermittent concern might be removed by cleaning the variable valve timing mode control function.<br>Go to the next step. |
| | | No | Replace the variable valve timing actuator, then go to the next step. |
| 15 | **VERIFY TROUBLESHOOTING OF DTC P0340 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Access the MAF PID using the M-MDS.<br>**Note**<br>• The MAF PID should indicate **1.95 g/s {0.25 lb/min.} or above** during this test<br>• Is same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 16 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0401[L3 WITH TC]

id010239815300

| DTC P0401 | EGR flow insufficient detected |
|---|---|
| **DETECTION CONDITION** | • PCM monitors the difference in intake manifold pressures when the EGR is operated and when it is stopped. If the difference is too small, the PCM determines that the EGR flow is insufficient.<br>**Diagnostic support note**<br>• This is an intermittent monitor (EGR system).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • EGR valve malfunction<br>• MAP sensor malfunction<br>• EGR gasket malfunction<br>• Vacuum hose looseness or damage<br>• PCM malfunction |

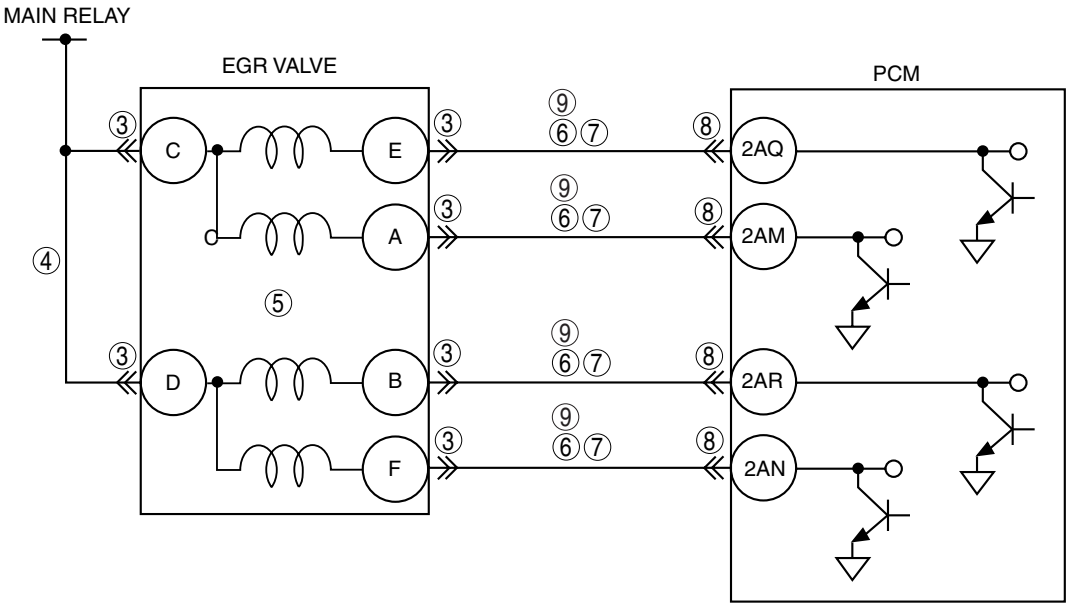
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (EGR system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FOR OTHER DTCS**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Have other DTCs been stored? | Yes | Repair the circuit malfunction for applicable DTCs. |
| | | No | Go to the next step. |
| 4 | **INSPECT VACUUM HOSE CONDITION**<br>• Inspect freezing vacuum hoses for clogs, damage, frozen, or vacuum leakage.<br>• Is there any malfunction? | Yes | Replace the vacuum hoses, then go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT EGR VALVE MALFUNCTION**<br>• Inspect the EGR valve. (See01-16-12 EGR VALVE INSPECTION[L3 WITH TC].)<br>• Is the EGR valve normal? | Yes | Go to the next step. |
| | | No | Replace the EGR valve, then go to Step 8. |
| 6 | **INSPECT MAP SENSOR MALFUNCTION**<br>• Perform the MAP sensor inspection. (See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the EGR valve normal? | Yes | Go to the next step. |
| | | No | Replace the MAP sensor, then go to Step 8. |
| 7 | **INSPECT EGR VALVE PASSAGE**<br>• Turn the ignition switch off.<br>• Remove the EGR valve.<br>• Is the gasket installation normal? | Yes | Go to the next step. |
| | | No | Install the gasket correctly, then go to the next step. |
| 8 | **MONITOR EGR SYSTEM BY DRIVE MODE**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Run the PCM Adaptive Memory Procedure Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Stop the vehicle and access the ON BOARD READINESS TEST to inspect the DRIVE MODE completion status.<br>• Verify the FUEL_EVAL and EGR_EVAL PIDs status.<br>• Do the FUEL_EVAL and EGR_EVAL PIDs change to Yes? | Yes | Go to the next step. |
| | | No | Retry this step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0401 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Access the DIAGNOSTIC MONITORING TEST RESULTS. (See01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC].)<br>• Verify the TEST #10: 31: 83 (EGR pressure variation) value.<br>• Is the value within the specification? | Yes | Go to the next step. |
| | | No | Replace the PCM, then go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

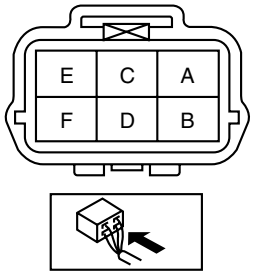
## DTC P0403[L3 WITH TC]

id010239807100

| DTC P0403 | EGR valve (stepper motor) circuit malfunction |
|---|---|
| DETECTION CONDITION | • PCM monitors the input voltage from the EGR valve. If the voltage remain low or high, the PCM determines that the EGR valve circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during first drive cycle.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are not stored in the PCM memory. |
| POSSIBLE CAUSE | • EGR valve malfunction<br>• Connector or terminal malfunction<br>• Short to the power supply in the wiring harness between EGR valve terminal E and PCM terminal 2AQ<br>• Short to the power supply in the wiring harness between EGR valve terminal A and PCM terminal 2AM<br>• Short to the power supply in the wiring harness between EGR valve terminal B and PCM terminal 2AR<br>• Short to the power supply in the wiring harness between EGR valve terminal F and PCM terminal 2AN<br>• Short to ground circuit in wiring harness between EGR valve terminal E and PCM terminal 2AQ<br>• Short to ground circuit in wiring harness between EGR valve terminal A and PCM terminal 2AM<br>• Short to ground circuit in wiring harness between EGR valve terminal B and PCM terminal 2AR<br>• Short to ground circuit in wiring harness between EGR valve terminal F and PCM terminal 2AN<br>• Open circuit in the wiring harness between EGR valve terminal E and PCM terminal 2AQ<br>• Open circuit in the wiring harness between EGR valve terminal A and PCM terminal 2AM<br>• Open circuit in the wiring harness between EGR valve terminal B and PCM terminal 2AR<br>• Open circuit in the wiring harness between EGR valve terminal F and PCM terminal 2AN<br>• Open circuit in the wiring harness between main relay terminal D and EGR valve terminal C<br>• Open circuit in the wiring harness between main relay terminal D and EGR valve terminal D<br>• PCM malfunction |




EGR VALVE
WIRING HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT EGR VALVE CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the EGR valve connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminals and/or connector, then go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT POWER CIRCUIT FOR OPEN CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage following the terminal and body ground.<br>— EGR valve terminal C (harness-side)<br>— EGR valve terminal D (harness-side)<br>• Is voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit then go to Step 10. |
| 5 | **INSPECT EGR VALVE**<br>• Perform the EGR valve inspection. (See01-16-12 EGR VALVE INSPECTION[L3 WITH TC].)<br>• Is the EGR valve normal? | Yes | Go to the next step. |
| | | No | Replace the EGR valve, then go to Step 10. |
| 6 | **INSPECT FOR CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between the following terminals and body ground:<br>— EGR valve terminal E (harness-side)<br>— EGR valve terminal A (harness-side)<br>— EGR valve terminal B (harness-side)<br>— EGR valve terminal F (harness-side)<br>• is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT FOR CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the following terminals and body ground:<br>— EGR valve terminal E (harness-side)<br>— EGR valve terminal A (harness-side)<br>— EGR valve terminal B (harness-side)<br>— EGR valve terminal F (harness-side)<br>• Is voltage **B+**? | Yes | Repair or replace wiring harness for a short to power supply, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminals and/or connector, then go to Step 10. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | **INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Remove the PCM with PCM connector connected.<br>• Inspect for continuity between the following terminals (harness-side):<br>— Between EGR valve terminal E and PCM terminal 2AQ<br>— Between EGR valve terminal A and PCM terminal 2AM<br>— Between EGR valve terminal B and PCM terminal 2AR<br>— Between EGR valve terminal F and PCM terminal 2AN<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace harness for open circuit then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0403 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0421[L3 WITH TC]

id010239807300

| DTC P0421 | Warm up catalyst system efficiency below threshold |
|---|---|
| **DETECTION CONDITION** | • The PCM compares the number of front HO2S and rear HO2S inversions for a predetermined time. The PCM monitors the number of inversions the rear side performs while the front side inverts for a specified number of times when the following monitoring conditions are met. The PCM detects the inversion ratio. If the inversion ratio is below the threshold, The PCM determines that the catalyst system has deteriorated.<br>**MONITORING CONDITIONS**<br>— Engine speed:**1,500— 3,000 rpm**<br>— Calculated TWC temperature: **above 400 °C {752 °F}**<br>— LOAD:**15— 48%** (at engine speed of **2,000 rpm**)<br>**Diagnostic support note**<br>• This is an intermittent monitor (Catalyst).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• DIAGNOSTIC MONITORING TEST RESULTS is available.<br>• FREEZE FRAME DATA is available.<br>• The DTC is stored in the PCM memory. |
| **POSSIBLE CAUSE** | • TWC deterioration or malfunction<br>• Exhaust gas leakage<br>• Loose front HO2S<br>• Loose rear HO2S<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Catalyst related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs.<br>• Are other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT EXHAUST SYSTEM FOR EXHAUST GAS LEAKAGE**<br>• Visually inspect for exhaust gas leakage in the exhaust system.<br>• Is there exhaust gas leakage? | Yes | Repair or replace the malfunctioning part, then go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT INSTALLATION OF FRONT AND REAR HO2S**<br>• Inspect the front and rear HO2S for looseness.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Retighten the sensor, then go to Step 7.<br>(See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 6 | **INSPECT TWC**<br>• Clear the DTC using the M-MDS generic OBD function.<br>• Turn the ignition switch off then back to the ON position.<br>• Inspect the TWC.<br>(See01-16-14 WARM-UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Replace the heated oxygen sensor, then go to the next step. |
| | | No | Replace the TWC, then go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0421 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Perform the HO2S heater, HO2S, and TWC Repair Verification Drive Mode.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0441[L3 WITH TC]

id010239041100

| DTC P0441 | Evaporative emission control system incorrect purge flow |
|---|---|
| DETECTION CONDITION | • PCM measures the purge line pressure under the following conditions. If the vacuum between the charcoal canister and the intake manifold does not reach the specification, PCM determines that the EVAP system is clogged.<br>**MONITORING CONDITION**<br>— Engine speed: **1,500— 3,000 rpm**<br>— Vehicle speed: **53— 136 km/h {32.9— 84.5 mph}**<br>**Diagnostic support note**<br>• This is an intermittent monitor (Evaporative emission system).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTC is stored in the PCM memory.<br>• DIAGNOSTIC MONITORING TEST RESULT is available. |
| POSSIBLE CAUSE | • Purge solenoid valve malfunction<br>• Evaporative emission system leak detection pump malfunction<br>• Charcoal canister malfunction<br>• EVAP hose damaged or loose<br>• EVAP pipe damaged<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Evaporative emission system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Is DTC P0443 present? | Yes | Go to the appropriate DTC inspection. |
| | | No | Go to the next step. |
| 4 | **DETERMINE IF LEAK CONCERN OR BLOCKAGE CONCERN**<br>• Perform the evaporative system leak inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the system inspection fail? | Yes | Go to Step 6. |
| | | No | Go to the next step. |
| 5 | **INSPECT IF PURGE SOLENOID VALVE STUCK CLOSED**<br>• Inspect if the purge solenoid valve is stuck closed.<br>(See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the purge solenoid valve normal? | Yes | Inspect the following parts for clogging.<br>• Vacuum hoses between the intake manifold to the charcoal canister<br>• Catch tank<br>• Charcoal canister<br>Repair or replace the part, then go to Step 11. |
| | | No | Replace the purge solenoid valve, then go to Step 11. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **LOCATE LEAK POINT**<br>• Inspect the following for leakage using the ultrasonic leak detector.<br>— Charcoal canister<br>— Catch tank<br>— Fuel filler cap<br>— EVAP hoses and pipes<br>— Fuel tank<br>• Is leakage found? | Yes | Repair leakage or replace the part, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP**<br>• Connect all disconnected connectors and hoses.<br>• Place a clamp on the EVAP system leak detection pump hose between the EVAP system leak detection pump and air filter.<br>• Perform the evaporative system leak inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail (red light turns on)? | Yes | Go to Step 9. |
| | | No | Go to the next step. |
| 8 | **CONFIRM EVAP SYSTEM LEAK DETECTION PUMP LEAKAGE**<br>• Remove the clamp.<br>• Perform the evaporative system leak inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail (red light turns on)? | Yes | Replace the EVAP system leak detection pump, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL PUMP UNIT INSTALLATION**<br>• Remove the fuel tank.<br>• Visually inspect for damage, insufficient sealing or a poorly installed pump unit.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace the fuel tank or sealing, then go to the next step. |
| 10 | **PERFORM LEAK INSPECTION**<br>• Connect all disconnected connectors and hoses.<br>• Perform the evaporative system leak inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail (red light turns on)? | Yes | Leakage still exists. Locate leak the point and repair. Then go to the next step. |
| | | No | Go to the next step |
| 11 | **VERIFY TROUBLESHOOTING OF DTC P0441 COMPLETED**<br>• Start the engine and let it idle.<br>• Clear the DTC using the M-MDS.<br>• Turn the ignition switch off.<br>• Perform the “EVAP System Repair Verification Drive Mode”.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC])<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 12 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0442[L3 WITH TC]

id010239807500

| DTC P0442 | Evaporative emission control system leak detected (small leak) |
|---|---|
| DETECTION CONDITION | • PCM measures the pump load current (EVAP line pressure) when the specified period has passed after the EVAP system is sealed when the monitoring conditions are met. If the load does not reach the reference current value within the specified period, the PCM determines that the EVAP system has a small leak.<br>**MONITORING CONDITION**<br>— The ignition switch is turned off.<br>— IAT: **5— 35 °C {40— 95 °F}**<br>— Battery voltage: **11— 20 V**<br>— Atmospheric pressure: **72.2 kPa {542 mmHg, 21.3 inHg} or above**<br>— Fuel tank level: **15— 85%**<br>**Diagnostic support note**<br>• This is an intermittent monitor (Evaporative emission system).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory.<br>• DIAGNOSTIC MONITORING TEST RESULT is available. |
| POSSIBLE CAUSE | • Purge solenoid valve malfunction<br>• EVAP system leak detection pump malfunction<br>• Charcoal canister malfunction<br>• Fuel filler cap malfunction<br>• Fuel tank malfunction<br>• Fuel pump unit poor seal<br>• EVAP hose damaged or loose<br>• EVAP pipe damaged |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Evaporative emission system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify related PENDING CODE or stored DTCs.<br>• Are other DTCs present? | Yes | Go to the appropriate DTC inspection. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN**<br>• Perform evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail? | Yes | Go to the next step. |
| | | No | Intermittent concern exists. Inspect the purge solenoid valve and the EVAP system leak detection pump circuit for an intermittent concern. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 5 | **LOCATE LEAK POINT**<br>• Inspect for leakage for the following using the Evaporative Emissions Tester.<br>— Charcoal canister<br>— Catch tank<br>— Fuel filler cap<br>— EVAP hoses and pipes<br>— Fuel tank<br>• Is leakage found? | Yes | Repair the leakage or replace the part, then go to Step 10. |
| | | No | Go to the next step. |

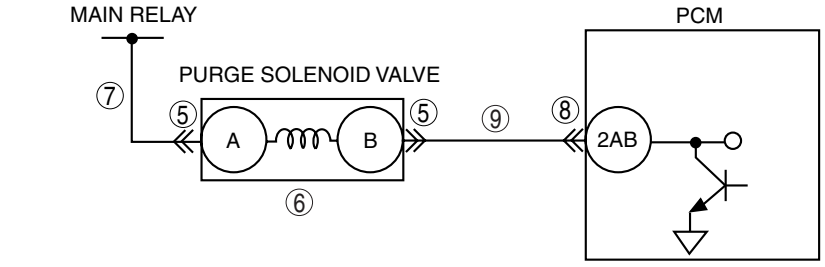
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT PURGE SOLENOID VALVE**<br>• Inspect purge solenoid valve is stuck closed. (See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the purge solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve, then go to Step 10. |
| 7 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP**<br>• Connect all disconnected connectors and hoses.<br>• Place the clamp on the EVAP system leak detection pump hose between the EVAP system leak detection pump and the air filter.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail? | Yes | Go to Step 9. |
| | | No | Go to the next step. |
| 8 | **CONFIRM EVAP SYSTEM LEAK DETECTION PUMP LEAKAGE**<br>• Remove the clamp.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result failed? | Yes | Replace the EVAP system leak detection pump, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL PUMP UNIT INSTALLATION**<br>• Remove the fuel tank.<br>• Visually inspect for damage, insufficient sealing or a poorly installed pump unit.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace the fuel tank or sealing, then go to the next step. |
| 10 | **PERFORM LEAK INSPECTION**<br>• Connect all disconnected connectors and hoses.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result failed? | Yes | Leakage still exists. Locate the leak point and repair. Then go to the next step. |
| | | No | Go to the next step |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0443[L3 WITH TC]

id010239807600

| DTC P0443 | EVAP control system purge control valve circuit malfunction |
|---|---|
| DETECTION CONDITION | • PCM monitors the input voltages from the purge solenoid valve. If the voltage remains low or high, the PCM determines that the purge solenoid valve circuit has a malfunction.<br>**Diagnostic support note**<br>• This is an continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Purge solenoid valve malfunction<br>• Connector or terminal malfunction<br>• Short to ground in the wiring harness between purge solenoid valve terminal B and PCM terminal 2AB<br>• Open circuit in the wiring harness between the main relay and purge solenoid valve terminal A<br>• Open circuit in the wiring harness between purge solenoid valve terminal B and PCM terminal 2AB<br>• Short to the power supply between purge solenoid valve terminal B and PCM terminal 2AB<br>• PCM malfunction |

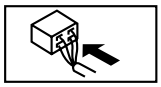
| DTC P0443 | EVAP control system purge control valve circuit malfunction |
|---|---|

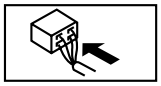



PURGE SOLENOID VALVE
WIRING HARNESS SIDE CONNECTOR

PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY OPEN CIRCUIT OR SHORT TO GROUND MALFUNCTION**<br>• Disconnect the purge solenoid valve tube that is connected to the intake manifold.<br>• Connect the vacuum pump to the purge solenoid valve.<br>• Pump the vacuum pump several times and stop.<br>• Wait **a few seconds.**<br>• Is the vacuum maintained? | Yes | Go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT PASSAGE CONTROL OF PURGE SOLENOID VALVE**<br>• Turn the ignition switch off.<br>• Disconnect the purge solenoid valve connector.<br>• Pump the vacuum pump several times and wait **a few seconds.**<br>• Is the vacuum maintained? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 10. |
| | | No | Replace the purge solenoid valve, then go to Step 10. |
| 5 | **INSPECT PURGE SOLENOID VALVE CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Inspect for poor connection (damaged/pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 6 | **INSPECT PURGE SOLENOID VALVE**<br>• Perform the purge solenoid valve inspection. (See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the purge solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve, then go to Step 10. |

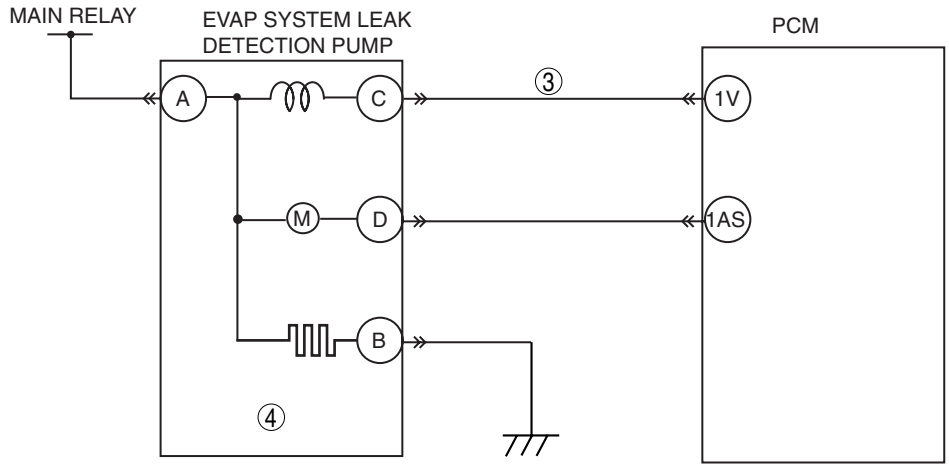
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT PURGE SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between purge solenoid valve connector terminal A and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged/pulled-out pins, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT PURGE SOLENOID VALVE CONTROL CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure voltage between purge solenoid valve terminal B (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a short to power supply, then go to the next step. |
| | | No | Inspect for continuity between purge solenoid valve terminal B (harness-side) and PCM terminal 2AB (harness-side).<br>• If there is continuity, go to the next step.<br>• If there is no continuity, repair or replace the wiring harness for an open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0443 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0446[L3 WITH TC]

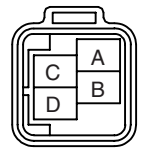
id010239807700

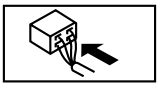
| DTC P0446 | Change over valve (COV) (EVAP system leak detection pump) stuck close |
|---|---|
| DETECTION CONDITION | • The PCM monitors the pump load current (EVAP line pressure), while the EVAP leak monitor is operating. When the decrease in the pump load current is less than the specification after the reference current value has been obtained, the PCM determines that the change over-valve (COV) in the EVAP system leak detection pump has a malfunction.<br>**Diagnostic support note**<br>• This is an intermittent monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • COV (in EVAP system leak detection pump.) malfunction<br>• Short to the power circuit between the EVAP system leak detection pump terminal C and PCM terminal 1V<br>• PCM malfunction |

| DTC P0446 | Change over valve (COV) (EVAP system leak detection pump) stuck close |
|---|---|



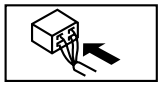

EVAP SYSTEM LEAK DETECTION PUMP WIRING HARNESS-SIDE CONNECTOR



PCM WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (EVAP system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnostic according to the available repair information.<br>• If the vehicle is not repaired, then go to the next step. |
| | | No | Go to the next step. |
| 3 | **CHECK COV CONTROL (EVAP SYSTEM LEAK DETECTION PUMP CIRCUIT FOR SHORT TO POWER)**<br>• Turn ignition switch to the ON position (engine OFF).<br>• Disconnect the EVAP system leak detection pump connector.<br>• Measure the voltage between EVAP system leak detection pump connector terminal C (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT COV (EVAP SYSTEM LEAK DETECTION PUMP)**<br>• Inspect the EVAP system leak detection pump. (See01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION[L3 WITH TC].)<br>• Is the COV (EVAP system leak detection pump) normal? | Yes | Go to the next step. |
| | | No | Replace the EVAP system leak detection pump, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0446 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the EVAP system test using the M-MDS.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the same DTC present?<br><br>**Note**<br>• If the EVAP system test function is not available, preform the following procedure:<br>— Perform “EVAP System Repair Verification Drive Mode”.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC])<br>— Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

**DTC P0455[L3 WITH TC]**

id010239815500

| DTC P0455 | Evaporative emission control system leak detected (gross leak) |
|---|---|
| **DETECTION CONDITION** | • PCM measures the pump load current (EVAP line pressure) when a specified period has passed after the EVAP system is sealed when monitoring conditions are met. If the load does not reach the reference current value within the specified period, the PCM determines that the EVAP system has a gross leak.<br>**MONITORING CONDITION**<br>— IG switch OFF<br>— IAT: **5— 35 °C {40— 95 °F}**<br>— Battery voltage: **11— 20 V**<br>— Atmospheric pressure: **72.2 kPa {542 mmHg, 21.3 inHg} or above**<br>— Fuel tank level: **15— 85%**<br>**Diagnostic support note**<br>• This is an intermittent monitor (Evaporative system monitor).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory.<br>• DIAGNOSTIC MONITORING TEST RESULT is available. |
| **POSSIBLE CAUSE** | • Purge solenoid valve malfunction<br>• EVAP system leak detection pump malfunction<br>• Loose, missing or detective fuel filler cap<br>• Charcoal canister malfunction<br>• Fuel tank malfunction<br>• Fuel tank misinstallation<br>• EVAP hose damaged or loose<br>• Poor connection or damaged vacuum hose |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Evaporative emission system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify related PENDING CODE or stored DTCs.<br>• Are DTCs P0443 and/or P0446 present? | Yes | Go to the appropriate DTC troubleshooting procedure. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN**<br>• Perform the evaporative system leak inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does test result fail? | Yes | Go to the next step. |
| | | No | Intermittent concern exists. Inspect the purge solenoid valve and the EVAP system leak detection pump circuit for an intermittent concern.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 5 | **INSPECT FUEL FILLER CAP**<br>• Verify that the fuel-filler cap is neither disconnected nor loose or damaged.<br>• Is it normal?<br>**Note**<br>• When a fuel-filler cap other than an OEM cap is attached, it is considered a malfunction. | Yes | Go to the next step. |
| | | No | Retighten the fuel-filler cap or replace it if it is damaged. Go to Step 17. |
| 6 | **INSPECT IF PURGE SOLENOID VALVE IS STUCK**<br>• Inspect the purge solenoid valve.<br>• Is the purge solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve, then go to Step 17. |
| 7 | **INSPECT COV (EVAP SYTEM LEAK DETECTION PUMP)**<br>• Inspect the EVAP system leak detection pump.<br>• Is the COV (EVAP leak detection pump) normal? | Yes | Go to the next step. |
| | | No | Replace the EVAP system leak detection pump, then go to Step 17. |
| 8 | **DETERMINE IF EVAP CONTROL SYSTEM FOR LEAKAGE OR BLOCKAGE**<br>**Note**<br>• If the evaporative emission tester is not available, then go to the next step.<br>• Perform the Evaporative System Leak Inspection.<br>• Does the system test fail? | Yes | Repair or replace malfunctioning area, then go to Step 17. |
| | | No | Go to the next step. |
| 9 | **INSPECT LEAKAGE OF CHARCOAL CANISTER TO FUEL PUMP**<br>• Disconnect the fuel tank side vacuum hose at the charcoal canister.<br>• Apply vacuum **1.7 KPa {13 mmHg, 0.5 inHg}** to the disconnected vacuum hose using a vacuum pump.<br>• Does the vacuum hold for a minimum of **2 min**? | Yes | Go to the Step 13. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **VERIFY POOR CONNECTION OF VACUUM HOSE**<br>• Verify the vacuum hose installation condition between the fuel tank and the charcoal canister.<br>• Is a poor connection detected? | Yes | Connect the vacuum hose correctly, then go to Step 17. |
| | | No | Go to the next step. |
| 11 | **INSPECT FUEL TANK INSTALLATION**<br>• Remove the fuel tank.<br>• Visually inspect for damage, insufficient sealing or poorly installed fuel pump unit.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace the fuel tank or sealing, then go to Step 17. |
| 12 | **INSPECT FUEL TANK**<br>• Inspect the fuel tank.<br>• Is it normal? | Yes | Replace the vacuum hose from the charcoal canister to the fuel tank, then go to the next step. |
| | | No | Replace the fuel tank, then go to the next step. |
| 13 | **INSPECT LEAKAGE FROM CHARCOAL CANISTER TO PURGE SOLENOID VALVE**<br>• Disconnect the purge solenoid valve side vacuum hose at the charcoal canister.<br>• Apply vacuum **3.3 KPa {25 mmHg, 1.0 inHg}** to the disconnected vacuum hose using a vacuum pump.<br>• Does the vacuum hold for a minimum of **2 min**? | Yes | Go to the Step 17. |
| | | No | Go to the next step. |
| 14 | **VERIFY POOR CONNECTION OF VACUUM HOSE**<br>• Verify the vacuum hose installation condition between the purge solenoid valve and the charcoal canister.<br>• Is a poor connection detected? | Yes | Connect the vacuum hose correctly, then go to Step 17. |
| | | No | Go to the next step. |
| 15 | **INSPECT PURGE SOLENOID VALVE FOR DAMAGE OR AIR LEAKAGE**<br>• Remove the purge solenoid valve and inspect for damage and air leakage.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve, then go to Step 17. |
| 16 | **INSPECT CHARCOAL CANISTER**<br>• Remove the charcoal canister and inspect for clogging, damage and pinholes.<br>• Is it normal? | Yes | Replace the vacuum hose from the charcoal canister to the purge solenoid valve, then go to the next step. |
| | | No | Replace the charcoal canister, then go to the next step. |
| 17 | **PERFORM LEAK INSPECTION**<br>• Connect all disconnected connectors.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail? | Yes | Leakage still exists. Locate the leak point and repair. Then go to the next step. |
| | | No | Go to the next step |
| 18 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0456[L3 WITH TC]

id010239807900

| DTC P0456 | Evaporative emission control system leak detected (very small leak) |
|---|---|
| DETECTION CONDITION | • PCM measures the pump load current (EVAP line pressure) when a specified period has passed after the EVAP system is sealed when monitoring conditions are met. If the load does not reach the reference load value or the rate of the load increase is lower than the specification within a specified period, the PCM determines that the EVAP system has a very small leak.<br>**MONITORING CONDITION**<br>— IG switch OFF<br>— IAT: **5— 35 °C {40— 95 °F}**<br>— Battery voltage: **11— 20 V**<br>— Atmospheric pressure: **72.2 kPa {542 mmHg, 21.3 inHg} or above**<br>— Fuel tank level: **15— 85%**<br>**Diagnostic support note**<br>• This is an intermittent monitor (Evaporative system monitor).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory.<br>• DIAGNOSTIC MONITORING TEST RESULT is available. |
| POSSIBLE CAUSE | • Purge solenoid valve malfunction<br>• EVAP system leak detection pump malfunction<br>• Charcoal canister malfunction<br>• Fuel cap malfunction<br>• Fuel tank malfunction<br>• Fuel pump unit poor seal<br>• EVAP hose damaged or loose<br>• EVAP pipe damaged |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Evaporative emission system related) been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch off then ON position (Engine off).<br>• Verify related PENDING CODE or stored DTCs.<br>• Are other DTC present? | Yes | Go to the appropriate DTC inspection. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN**<br>• Perform the evaporative system leak inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the system test result fail? | Yes | Go to the next step. |
| | | No | Intermittent concern exists. Inspect the purge solenoid valve and the EVAP system leak detection pump circuit for an intermittent concern.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **LOCATE LEAK POINT**<br>• Check for leakage for the following using the Evaporative Emission Tester<br>— Charcoal canister<br>— Catch tank<br>— Fuel filler cap<br>— EVAP hoses and pipes<br>— Fuel tank<br>• Is leakage found? | Yes | Repair the leakage or replace the part, then go to Step 10. |
| | | No | Go to the next step. |
| 6 | **INSPECT PURGE SOLENOID VALVE**<br>• Inspect if the purge solenoid valve is stuck closed.<br>(See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the purge solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve, then go to Step 10. |
| 7 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP**<br>• Connect all disconnected connectors and hoses.<br>• Place a clamp on the EVAP system leak detection pump hose between the EVAP system leak detection pump and the air filter.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail? | Yes | Go to Step 9. |
| | | No | Go to the next step. |
| 8 | **CONFIRM EVAP SYSTEM LEAK DETECTION PUMP LEAKAGE**<br>• Remove the clamp.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail? | Yes | Replace the EVAP system leak detection pump, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL PUMP UNIT INSTALLATION**<br>• Remove the fuel tank.<br>• Visually inspect for damage, insufficient sealing or a poorly installed pump unit.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace the fuel tank or sealing, then go to the next step. |
| 10 | **PERFORM LEAK INSPECTION**<br>• Connect all disconnected connectors and hoses.<br>• Perform the evaporative system leak inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the test result fail? | Yes | Leakage still exists. Locate the leak point and repair. Then go to the next step. |
| | | No | Go to next step |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0461[L3 WITH TC]

id010239808000

| DTC P0461 | Fuel gauge sender unit circuit range/performance |
|---|---|
| DETECTION CONDITION | • PCM monitors the fuel level voltage difference before and after the PCM-calculated fuel consumption has reached **25 L {26.4 US qt., 22 Imp qt.}**. If the difference is **5%** less than the PCM-calculated fuel consumption, the PCM determines that the fuel gauge sender unit range/performance is in error.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Fuel gauge sender unit malfunction or substandard performance<br>• Instrument cluster malfunction<br>• PCM malfunction |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL GAUGE SENDER UNIT**<br>• Turn the ignition switch off.<br>• Inspect the fuel gauge sender unit. (See09-22-14 FUEL GAUGE SENDER UNIT INSPECTION.)<br>• Is the fuel gauge sender unit normal? | Yes | Replace the PCM, then go to the next step. |
| | | No | Repair or replace the fuel gauge sender unit, then go to the next step. |
| 4 | **INSPECT INSTRUMENT CLUSTER**<br>• Perform the “INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE” procedure. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)<br>• Is there any malfunction? | Yes | Repair or replace the suspected malfunction, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0462[L3 WITH TC]

id010239808100

| DTC P0462 | Fuel gauge sender unit circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the signals of the fuel level and fuel gauge sender unit output voltage from the instrument cluster. If the PCM detects that the fuel level or fuel gauge sender unit output voltage is too low, the PCM determines that the fuel gauge sender unit circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Instrument cluster malfunction<br>• Fuel gauge sender unit malfunction<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL GAUGE SENDER UNIT**<br>• Turn the ignition switch off.<br>• Inspect the fuel gauge sender unit. (See09-22-14 FUEL GAUGE SENDER UNIT INSPECTION.)<br>• Is the fuel gauge sender unit normal? | Yes | Replace the PCM, then go to the next step. |
| | | No | Repair or replace the fuel gauge sender unit, then go to the next step. |
| 4 | **INSPECT INSTRUMENT CLUSTER**<br>• Perform the “INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE” procedure. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)<br>• Is there any malfunction? | Yes | Repair or replace the suspected malfunction, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0462 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0463[L3 WITH TC]

id010239808200

| DTC P0463 | Fuel gauge sender unit circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the signals of the fuel level and fuel gauge sender unit output voltage from the instrument cluster. If the PCM detects that the fuel level or fuel gauge sender unit output voltage is too high, the PCM determines that the fuel gauge sender unit circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Instrument cluster malfunction<br>• Fuel gauge sender unit malfunction<br>• PCM malfunction |



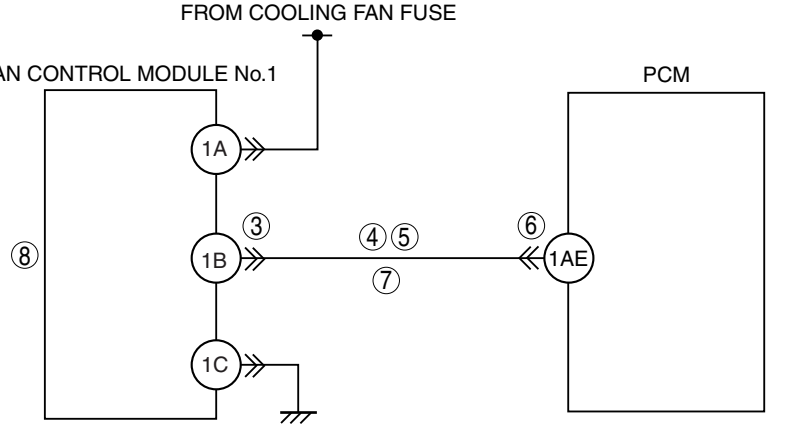
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL GAUGE SENDER UNIT**<br>• Turn the ignition switch off.<br>• Inspect the fuel gauge sender unit. (See09-22-14 FUEL GAUGE SENDER UNIT INSPECTION.)<br>• Is the fuel gauge sender unit normal? | Yes | Replace the PCM, then go to the next step. |
| | | No | Repair or replace the fuel gauge sender unit, then go to the next step. |
| 4 | **INSPECT INSTRUMENT CLUSTER**<br>• Perform “INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE” procedure. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)<br>• Is there any malfunction? | Yes | Repair or replace the suspected malfunction, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0463 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

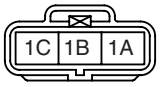
## DTC P0480[L3 WITH TC]

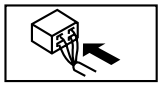
id010239807400

| DTC P0480 | Fan control circuit problem |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input voltage from the fan control module No.1. If the voltage remains low or high, the PCM determines that the fan control circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• The DTC is stored in the PCM memory. |
| POSSIBLE CAUSE | • Fan control module No.1 malfunction<br>• Connector or terminal malfunction<br>• Short to the power supply in the wiring harness between fan control module No.1 terminal 1B and PCM terminal 1AE<br>• Short to ground in the wiring harness between fan control module No.1 terminal 1B and PCM terminal 1AE<br>• Open circuit in the wiring harness between fan control module No.1 terminal 1B and PCM terminal 1AE<br>• PCM malfunction |



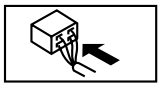

FAN CONTROL MODULE No.1
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



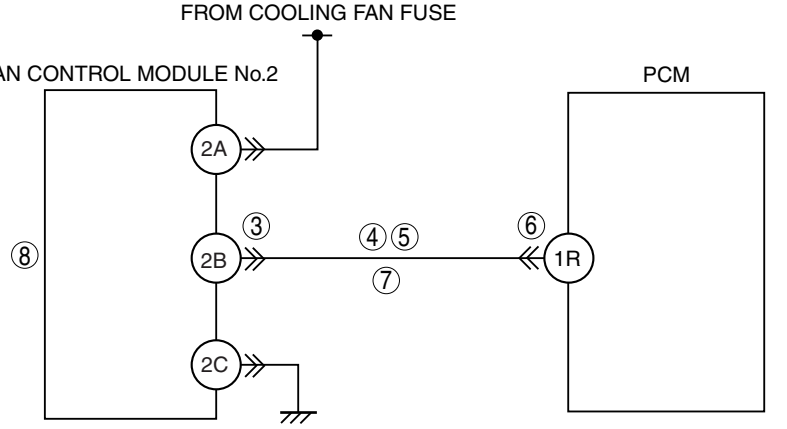
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FAN CONTROL MODULE No.1 CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fan control module No.1 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **INSPECT FAN CONTROL MODULE No.1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between fan control module No.1 terminal 1B (wiring harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| | | No | Go to the next step. |
| 5 | **INSPECT FAN CONTROL MODULE No.1 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between fan control module No.1 terminal 1B (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT FAN CONTROL module No.1 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between fan control module No.1 terminal 1B (wiring harness-side) and PCM terminal 1AE.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| 8 | **INSPECT FAN CONTROL module No.1**<br>• Perform the fan control module No.1 inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the fan control module No.1 normal? | Yes | Go to the next step. |
| | | No | Replace the fan control module No.1, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0480 COMPLETED**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Turn A/C switch to ON.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

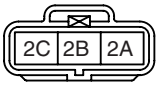
## DTC P0481[L3 WITH TC]

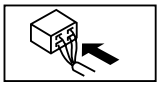
id010239815200

| DTC P0481 | Fan control circuit problem |
|---|---|
| DETECTION CONDITION | • The PCM monitors the input voltage from the fan control module No.2. If the voltage remains low or high, the PCM determines that the fan control circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• The DTC is stored in the PCM memory. |
| POSSIBLE CAUSE | • Fan control module No.2 malfunction<br>• Connector or terminal malfunction<br>• Short to the power supply in the wiring harness between fan control module No.2 terminal 2B and PCM terminal 1R<br>• Short to ground in the wiring harness between fan control module No.2 terminal 2B and PCM terminal 1R<br>• Open circuit in the wiring harness between fan control module No.2 terminal 2B and PCM terminal 1R<br>• PCM malfunction |



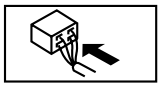

FAN CONTROL MODULE No.2
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FAN CONTROL MODULE No.2 CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the fan control module No.2 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT FAN CONTROL MODULE No.2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between fan control module No.2 terminal 2B (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| | | No | Go to the next step. |
| 5 | **INSPECT FAN CONTROL MODULE No.2 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between fan control module No.2 terminal 2B (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT FAN CONTROL MODULE No.2 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between fan control module No.2 terminal 2B (wiring harness-side) and PCM terminal 1R.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| 8 | **INSPECT FAN CONTROL MODULE No.2**<br>• Perform the fan control module No.2 inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the fan control module No.2 normal? | Yes | Go to the next step. |
| | | No | Replace the fan control module No.2, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0481 COMPLETED**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Turn A/C switch to ON.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P050A[L3 WITH TC]

id010239800000

| DTC P050A | Cold start idle air control system performance |
|---|---|
| DETECTION CONDITION | • Actual idle speed is lower than expected by **100 rpm** for **8.4 s** when target idle speed is **above 0 rpm** at cold start or ignition retard value is **above 8.9 deg.CA**.<br><br>**Note**<br>• If atmospheric pressure is **less than 72.3 kPa {542 mmHg, 21.3 inHg}** or intake air temperature is **below -10 °C {14 °F}**, the PCM cancels diagnosis of P0506.<br><br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTC is stored in the PCM memory. |

| DTC P050A | Cold start idle air control system performance |
|---|---|
| POSSIBLE CAUSE | • The air into the fuel line by exchange or re-installation<br>• Electronic throttle control system malfunction<br>• Throttle valve stuck or blockage<br>• Air suction in intake air system<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (CCM related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and diagnostic monitoring test results on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is P050A on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 4 | **INSPECT FUEL SYSTEM**<br>• Were any exchange or re-installation of fuel system performed just before the P050A stored? | Yes | Perform the air bleeding of fuel system.<br>• Start the engine and warm it up until engine speed is stable then go to the next step. |
| | | No | Go to Step 6. |
| 5 | **CONFIRM THE PENDING CODE**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Cool down the engine still ECT below 30 °C {86 °F}.<br>• Perform the cold start.<br>• Is the PENDING CODE for this DTC present? | Yes | Go to the next step. |
| | | No | Go to Step 9. |
| 6 | **CHECK AIR SUCTION IN INTAKE AIR SYSTEM**<br>• Start the engine.<br>• Check air suction between MAF sensor and intake manifold.<br>• Is there any air suction in the intake air system? | Yes | Repair or replace malfunctioning part, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **VERIFY ELECTRONIC THROTTLE CONTROL SYSTEM OPERATION**<br>• Perform the Electronic Throttle Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC], Electronic Throttle Control System Inspection.)<br>• Does the electronic throttle control system operate properly? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning part according to inspection result.<br>Then go to Step 9. |
| 8 | **VERIFY THROTTLE VALVE**<br>• Turn the ignition switch off.<br>• Remove the throttle valve with connector connected.<br>• Access ETC_DSD PID using the M-MDS.<br>• Turn the ignition switch to ON position (Engine off).<br>• Move the throttle valve using the ETC_DSD PID simulation function.<br>• Dose the throttle valve move smoothly? | Yes | Go to the next step. |
| | | No | Clean the throttle valve and retest.<br>If the problem does not resolve, replace the throttle body.<br>Then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P050A COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear DTC from the PCM memory using the M-MDS.<br>• Perform the KOER self-test using the M-MDS. (See01-02-13 DTC TABLE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTC present? | Yes | Go to the applicable DTC troubleshooting.(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |



## DTC P050B[L3 WITH TC]

id010239799900

| DTC P050B | Cold start ignition timing performance |
|---|---|
| DETECTION CONDITION | • The PCM monitors actual ignition timing using the CKP sensor while electronic spark advance control fast idle correction operating. If the ignition timing is out of specified range, the PCM determines that the ignition timing at cold condition has performance problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTC is stored in the PCM memory. |
| POSSIBLE CAUSE | • The air into the fuel line by exchange or re-installation<br>• Damaged CKP sensor<br>• Damaged CMP sensor<br>• Damaged or chipped CKP sensor pulse wheel<br>• Damaged or chipped CMP sensor pulse wheel<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (CCM related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and diagnostic monitoring test results on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is P050B on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 4 | **INSPECT FUEL SYSTEM**<br>• Were any exchange or re-installation of fuel system performed just before the P050B stored? | Yes | Perform the air bleeding of fuel system.<br>• Start the engine and warm it up until engine speed is stable then go to the next step. |
| | | No | Go to Step 6. |
| 5 | **CONFIRM THE PENDING CODE**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Cool down the engine still ECT below 30 °C {86 °F}.<br>• Perform the cold start.<br>• Is the PENDING CODE for this DTC present? | Yes | Go to the next step. |
| | | No | Go to Step 10. |
| 6 | **VISUALLY INSPECT CKP SENSOR AND PULSE WHEEL**<br>• Visually inspect for CKP sensor and pulse wheel.<br>• Is there any damage or chip on CKP sensor and pulse wheel? | Yes | Replace the suspected part, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT CKP SENSOR**<br>• Inspect CKP sensor. (See01-40-43 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the CKP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the CKP sensor, then go to Step 10. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VISUALLY INSPECT CMP SENSOR AND PULSE WHEEL**<br>• Visually inspect for CMP sensor and pulse wheel.<br>• Is there any damage or chip on CMP sensor and pulse wheel? | Yes | Replace the suspected part, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT CMP SENSOR**<br>• Inspect CMP sensor. (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the CMP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the CMP sensor, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P050B COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear DTC from the PCM memory using the M-MDS.<br>• Perform the KOER self-test using the M-MDS. (See01-02-13 DTC TABLE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTC present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0500[L3 WITH TC]

id010239808400

| DTC P0500 | Vehicle speed sensor (VSS) circuit malfunction |
|---|---|
| **DETECTION CONDITION** | • Wheel speed signal from the DSC HU/CM is **below 3.7 km/h {2.3 mph}** when the following conditions are met:<br>— Neutral switch and CPP switch are off<br>— Load is above **40%**<br>— Engine speed is **2,000 rpm or above**<br>— Brake switch is OFF<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| **POSSIBLE CAUSE** | • Front ABS wheel-speed sensor malfunction<br>• DSC malfunction<br>• Connector or terminal malfunction<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME PID DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME PID DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED SERVICE INFORMATION AVAILABILITY**<br>• Check for related Service Information availability.<br>• Is any related Service Information available? | Yes | Perform the repair or diagnosis according to available Service Information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY STORED DTC IN DSC HU/CM**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Verify stored DTCs in the DSC HU/CM. (See04-02-3 ON-BOARD DIAGNOSIS.)<br>• Are DTCs stored**?** | Yes | Go to the appropriate DTC inspection. (See04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **VERIFY TROUBLESHOOTING OF DTC P0500 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Warm up the engine.<br>• Access the RPM and LOAD PID using the M-MDS.<br>• Drive the vehicle under the following conditions for **18s.**<br>— Engine speed: **2,000 rpm or above**<br>— Gear: Gear is in other than NEUTRAL<br>— Load: **40% or above**<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0505[L3 WITH TC]

id010239808500

| DTC P0505 | IAC system problem |
|---|---|
| **DETECTION CONDITION** | • The PCM cannot control idle speed toward the target idle speed during the KOER self test. |
| **POSSIBLE CAUSE** | • Air cleaner element clogged<br>• Air intake passage clogged<br>• A/C relay control circuit malfunction<br>• Generator control circuit malfunction<br>• Low engine compression (Over capacity of blow-by gas)<br>• Electronic throttle control system improper operation<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 2 | **VERIFY RELATED PENDING OR STORED DTCs**<br>• Turn the ignition switch off then to the ON position. (Engine off)<br>• Verify pending code or stored DTCs using the M-MDS.<br>• Are DTCs P0506, P0507, P0638, P2100, P2101, P2102, P2103, P2108, or P2119 present? | Yes | Perform the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 3 | **VERIFY ELECTRONIC THROTTLE CONTROL SYSTEM OPERATION**<br>• Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the electronic throttle control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to the inspection result.<br>Then go to Step 9. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT A/C MAGNETIC CLUTCH OPERATION**<br><br>**Note**<br>• The following test should be performed for vehicles with A/C. Go to the next step for vehicles without A/C<br><br>• Turn the fan switch off.<br>• Is the magnetic clutch still on? | Yes | Go to "A/C ALWAYS ON / A/C COMPRESSOR RUNS CONTINUOUSLY." of ENGINE SYMPTOM TROUBLESHOOTING then go to Step 9. (See01-03-5 ENGINE SYMPTOM TROUBLESHOOTING[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT GENERATOR CONTROL CIRCUIT MALFUNCTION**<br>• Apply electrical load.<br>• Does the engine speed increase? | Yes | Go to the next step. |
| | | No | Repair for a short to the power supply in the generator control circuit, then go to Step 9. |
| 6 | **INSPECT AIR CLEANER ELEMENT**<br>• Remove the air cleaner element with the engine running.<br>• Does the engine speed increase? | Yes | Clean or replace the air cleaner element, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT THROTTLE BODY PASSAGE**<br>• Is the throttle body clogged? | Yes | Clean or replace the throttle body passage, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression. (See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is the engine compression normal? | Yes | Go to the next step. |
| | | No | Overhaul the engine, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0505 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC using the M-MDS.<br>• Perform the KOER Self-Test.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the "AFTER REPAIR PROCEDURE". (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0506[L3 WITH TC]

id010239808600

| DTC P0506 | Idle control system RPM lower than expected |
|---|---|
| DETECTION CONDITION | • Actual idle speed is lower than expected by **100 rpm** for **14 s** when the brake pedal is depressed (brake switch is on) and the steering wheel is held straight ahead (power steering pressure switch is off).<br><br>**Note**<br>• If the atmospheric pressure is **less than 72.3 kPa {542 mmHg, 21.3 inHg}** or the intake air temperature is **below –10 °C {14 °F}**, the PCM cancels the diagnosis of P0506.<br><br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Electronic throttle control system malfunction<br>• Air cleaner element clogged<br>• Air intake passage clogged<br>• A/C relay control circuit malfunction<br>• Generator malfunction<br>• Purge solenoid valve malfunction<br>• Low engine compression (Over capacity of blow-by gas)<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED SERVICE INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, then go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING OR STORED DTCS**<br>• Turn ignition switch to OFF, then ON (Engine off).<br>• Verify pending code or stored DTCs using the M-MDS.<br>• Are other DTCs present? | Yes | Repair the applicable DTCs.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT A/C MAGNET CLUTCH OPERATION**<br>• Turn the blower motor switch off.<br>• Is the magnet clutch still on? | Yes | Refer to "A/C is always on or A/C compressor runs continuously." of ENGINE SYMPTOM TROUBLESHOOTING, then go to Step 11.<br>(See01-03-69 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT ELECTRONIC THROTTLE CONTROL SYSTEM MALFUNCTION**<br>• Inspect the following parts:<br>— APP sensor<br>(See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>— TP sensor<br>(See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Replace the necessary parts, then go to Step 11. |
| 6 | **INSPECT PURGE SOLENOID VALVE MALFUNCTION**<br>• Perform the purge solenoid valve inspection.<br>(See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the purge solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve, then go to Step 11. |
| 7 | **INSPECT AIR CLEANER ELEMENT**<br>• Remove the air cleaner element with the engine running.<br>• Does the engine speed increase? | Yes | Replace the air cleaner element, then go to Step 11. |
| | | No | Go to the next step. |
| 8 | **INSPECT THROTTLE BODY PASSAGE**<br>• Is the throttle body clogged? | Yes | Clean or replace the throttle body passage, then go to Step 11. |
| | | No | Go to the next step. |
| 9 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is the engine compression normal? | Yes | Go to the next step. |
| | | No | Overhaul the engine, then go to Step 11. |
| 10 | **INSPECT GENERATOR**<br>• Perform the generator inspection.<br>(See01-17-6 GENERATOR INSPECTION[L3 WITH TC].)<br>• Is the generator normal? | Yes | Go to the next step. |
| | | No | Repair or replace the related part, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 11 | **VERIFY TROUBLESHOOTING OF DTC P0506 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Start the engine.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Depress the brake pedal for **14 s or more.**<br>• Is PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 12 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0507[L3 WITH TC]

id010239808700

| DTC P0507 | Idle control system RPM higher than expected |
|---|---|
| DETECTION CONDITION | • Actual idle speed is higher than expected by **200 rpm** for **14 s** when the brake pedal is depressed (brake switch is on) and steering wheel is held straight ahead (power steering pressure switch is off).<br><br>**Note**<br>• If the atmospheric pressure is **less than 72.3 kPa {542 mmHg, 21.3 inHg}** or the intake air temperature is **below –10 °C {14 °F}**, the PCM cancels diagnosis of P0507.<br><br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Electronic throttle control system malfunction<br>• Vacuum hose misconnection<br>• PCM malfunction |

**Diagnostic procedure**

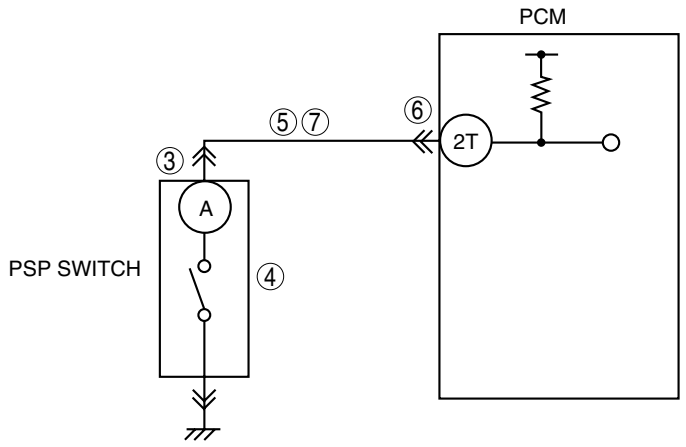
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED SERVICE INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, then go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING OR STORED DTCS**<br>• Turn ignition switch to off, then ON position (Engine off).<br>• Verify pending code or stored DTCs using the M-MDS.<br>• Are other DTCs present? | Yes | Repair applicable DTCs. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT VACUUM HOSE CONNECTION**<br>• Are the vacuum hoses connecting accurately? (See01-13-4 VACUUM HOSE ROUTING DIAGRAM[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Reconnect the vacuum hoses correctly, then go to step 6. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT ELECTRONIC THROTTLE CONTROL SYSTEM MALFUNCTION**<br>• Inspect the following parts:<br>— APP sensor<br>(See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>— TP sensor<br>(See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Replace the necessary parts, then go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0507 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Start the engine.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Depress the brake pedal for **14 s or more.**<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P0550[L3 WITH TC]

id010239808800

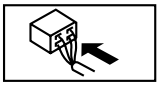
| DTC P0550 | PSP switch circuit malfunction |
|---|---|
| DETECTION CONDITION | • The PCM monitors the PSP switch signal, If the input voltage is low voltage (switch stays on) for **1 min.** when the VSS is **above 60.0 km/h {37.4 mph}** and the ECT is **above 60 °C {140 °F}**, the PCM determines that the PSP switch circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • PSP switch malfunction<br>• Connector or terminal malfunction<br>• Short to ground in the wiring harness between the PSP switch terminal and PCM terminal 2T<br>• Open circuit in the wiring harness between the PSP switch terminal and PCM terminal 2T<br>• PCM malfunction |

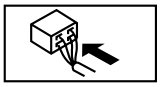



PSP SWITCH
WIRING HARNESS SIDE CONNECTOR

PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

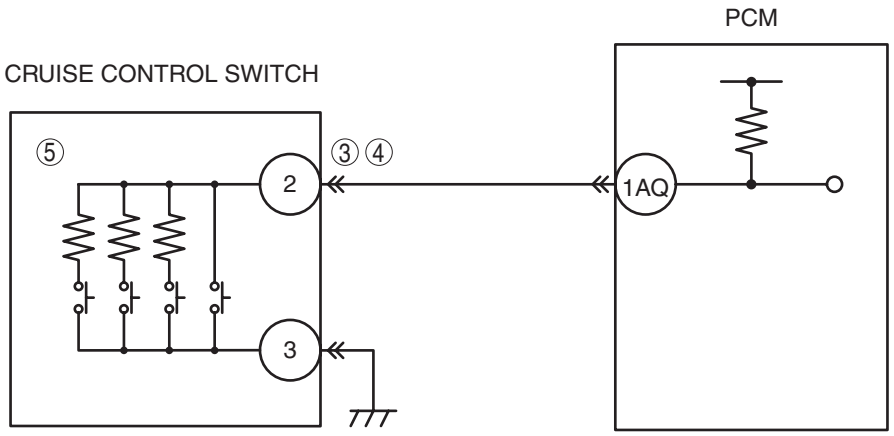
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair formation availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT PSP CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PSP connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **INSPECT PSP SWITCH**<br>• Perform the PSP switch inspection. (See01-40-22 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION[L3 WITH TC].)<br>• Is the PSP switch normal? | Yes | Go to the next step. |
| | | No | Replace the PSP switch, then go to Step 8. |
| 5 | **INSPECT PSP SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Disconnect the PCM connector.<br>• Inspect for continuity between the PSP switch terminal (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn ignition switch to OFF<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT SIGNAL CIRCUIT MALFUNCTION FOR OPEN CIRCUIT**<br>• Inspect for continuity between PSP terminal A (harness-side) and PCM terminal 2T (harness-side).<br>• Is there continuity? | Yes | Repair or replace the wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0550 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Start the engine.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Drive the vehicle **above 60 km/h {37.3 mph}** for**1 min.**<br>• Verify that the ECT PID is **above 60 °C {140 °F}** using the M-MDS.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

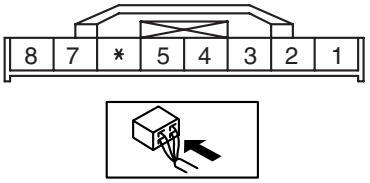
## DTC P0564[L3 WITH TC]

id010239808900

| DTC P0564 | Cruise control switch circuit malfunction |
|---|---|
| DETECTION CONDITION | • The PCM monitors the cruise control switch signal. If the PCM detects that any one of following switches (Main, CANCEL, SET/COAST, RESUME/ACCEL) remains on for **2 min**, the PCM determines that the cruise control switch circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Cruise control switch malfunction<br>• Connector or terminal malfunction<br>• Short to power circuit in wiring harness from cruise control switch terminal 2and PCM terminal 1AQ<br>• Short to ground circuit in wiring harness from cruise control switch terminal 2and PCM terminal 1AQ<br>• PCM malfunction |




CRUISE CONTROL SWITCH
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

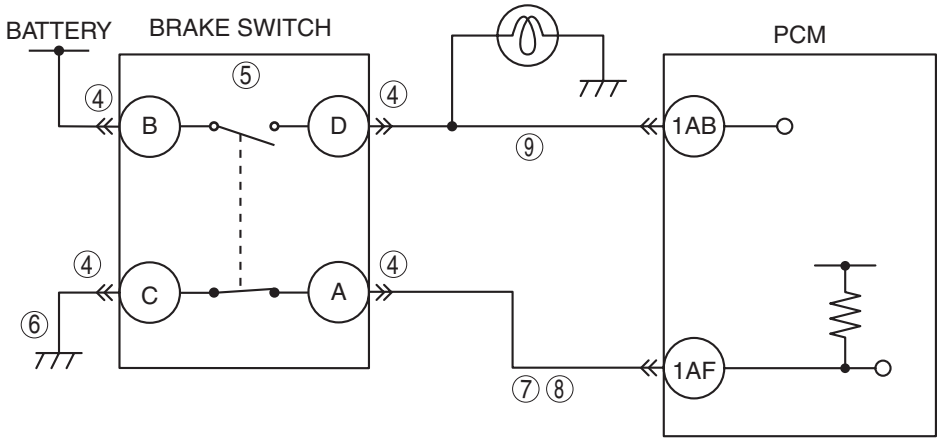
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 2 | **INSPECT CRUISE CONTROL SWITCH CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or the replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |
| 3 | **INSPECT CRUISE CONTROL SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Disconnect the cruise control switch and PCM connectors.<br>• Inspect for continuity between cruise control switch terminal 2 (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace for a short to ground, then go to Step 6. |
| | | No | Go to the next step. |
| 4 | **INSPECT CRUISE CONTROL SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Inspect the voltage between cruise control switch terminal 2 (wiring harness-side) and body ground.<br>• Is the voltage **below 1.0 V**? | Yes | Go to the next step. |
| | | No | Repair or replace for a short to the power supply, then go to Step 6. |
| 5 | **INSPECT CRUISE CONTROL SWITCH OPERATION**<br>• Inspect the cruise control switch. (See01-20-1 CRUISE CONTROL SWITCH INSPECTION[L3 WITH TC].)<br>• Is the cruise control switch normal? | Yes | Go to the next step. |
| | | No | Replace the cruise control switch, then go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF P0564 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Drive the vehicle using cruise control for **2 min. or more**.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

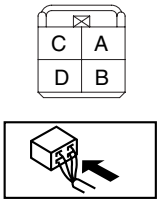
## DTC P0571[L3 WITH TC]

id010239809000

| DTC P0571 | Brake switch circuit problem |
|---|---|
| DETECTION CONDITION | • The PCM monitors the change in the input voltage for brake switch No.1 and No.2. If the PCM detects that both brake switches No.1 and No.2 remain on or off for **15 s**, it determines that the brake switch circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Brake switch malfunction<br>• Open circuit between brake switch terminal A and PCM terminal 1AF<br>• Open circuit between brake switch terminal C and body ground<br>• Short to the power between brake switch terminal A and PCM terminal 1AF<br>• Short to the ground circuit between brake switch terminal A and PCM terminal 1AF<br>• PCM malfunction |

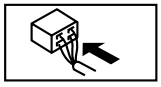



BRAKE SWITCH
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs.<br>• Is the DTC P0703 also present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the brake switch connector.<br>• Inspect for poor connection (such as damaged, pull-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT BRAKE SWITCH**<br>• Inspect the brake switch.<br>• Is the brake switch normal? | Yes | Go to the next step. |
| | | No | Replace the brake switch, then go to Step 10. |
| 6 | **INSPECT GROUND CIRCUIT OF BRAKE SWITCH NO.2 FOR OPEN CIRCUIT**<br>• Inspect for continuity between brake switch terminal C (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 7 | **INSPECT SIGNAL CIRCUIT OF BRAKE SWITCH NO.2 FOR SHORT TO GROUND**<br>• Inspect for continuity between brake switch terminal A (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground circuit, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT SIGNAL CIRCUIT OF BRAKE SWITCH NO.2 FOR OPEN CIRCUIT**<br>• Inspect for continuity between brake switch terminal A (wiring harness-side) and instrument cluster terminal 1AF (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 9 | **INSPECT SIGNAL CIRCUIT OF BRAKE SWITCH NO.2 FOR SHORT TO POWER**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between brake switch terminal D (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a short to power supply, then go to the next step. |
| | | No | Go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF P0571 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Depress and release the brake pedal **more than 5 times**.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0601[L3 WITH TC]

id010239809100

| DTC P0601 | Internal control module memory check sum error |
|---|---|
| DETECTION CONDITION | • PCM internal memory check sum error.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • PCM internal memory malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF P0601 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is same DTC present? | Yes | Replace the PCM, go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0602[L3 WITH TC]

id010239809200

| DTC P0602 | PCM programming error |
|---|---|
| DETECTION CONDITION | • No configuration data in PCM<br>**Note**<br>• If the “PCM CONFIGURATION” is successful, the PCM stores DTC P0602 and illuminates the MIL (System is normal). Clear DTC P0602 using the M-MDS after the “PCM CONFIGURATION”.<br>• MIL turns off after three drive cycles with no failure (DTCs remain in PCM).<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Configuration has not been completed.<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Perform PCM configuration procedure, then go to the next step.<br>(See01-40-21 PCM CONFIGURATION[L3 WITH TC].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0602 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

**DTC P0604[L3 WITH TC]**

id010239809300

| DTC P0604 | PCM RAM error |
|---|---|
| DETECTION CONDITION | • PCM internal RAM malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • PCM internal RAM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF P0604 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0606[L3 WITH TC]

id010239809400

| DTC P0606 | ECM/PCM processor |
|---|---|
| DETECTION CONDITION | • PCM internal CPU malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • PCM internal CPU malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF P0606 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start engine.<br>• Is same DTC present? | Yes | Replace PCM, go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0607[L3 WITH TC]

id010239809500

| DTC P0607 | PCM performance problem |
|---|---|
| DETECTION CONDITION | • PCM internal malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • PCM internal malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY TROUBLESHOOTING OF P0607 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start engine.<br>• Is same DTC present? | Yes | Replace PCM, go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



### DTC P0610[L3 WITH TC]

id010239809600

| DTC P0610 | PCM vehicle options error |
|---|---|
| DETECTION CONDITION | • PCM data configuration error<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Configuration procedure has not been completed<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0610 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0638[L3 WITH TC]

id010239809800

| DTC P0638 | Throttle actuator control range/performance |
|---|---|
| DETECTION CONDITION | • The PCM compares the actual TP with the target TP when the engine is running. If the difference is more than the specification, the PCM determines that there is a throttle actuator control circuit range/ performance problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Throttle actuator malfunction<br>• Throttle valve malfunction<br>• PCM malfunction |

**Diagnostic procedure**

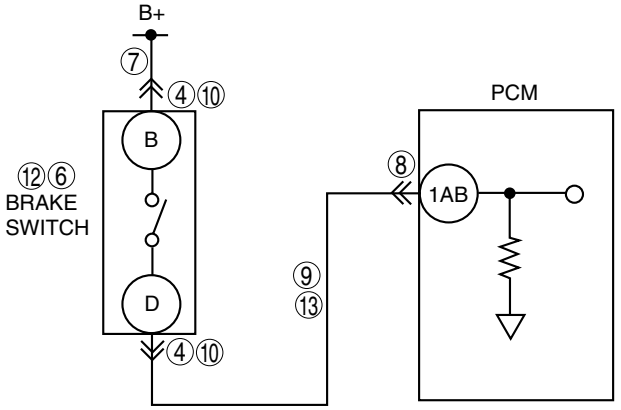
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FOR OTHER DTCS**<br>• Have other DTCs been stored? | Yes | Perform the diagnostic procedure for the applicable DTCs. |
| | | No | Go to the next step. |
| 4 | **INSPECT THROTTLE ACTUATOR**<br>• Inspect the throttle actuator. (See 01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC])<br>• Is the throttle actuator normal? | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING OF P0638 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and let it idle.<br>• Is the same DTC present? | Yes | Replace the PCM, go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P0703[L3 WITH TC]

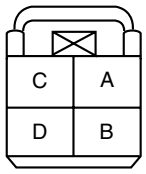
id010239809900

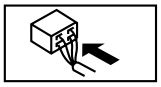
| DTC P0703 | Brake switch No.1 circuit malfunction |
|---|---|
| DETECTION CONDITION | • PCM monitors changes in the input voltage from the brake switch. If the PCM does not detect the voltage change while alternately accelerating and decelerating **8 times**, the PCM determines that the brake switch circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |

| DTC P0703 | Brake switch No.1 circuit malfunction |
|---|---|
| POSSIBLE CAUSE | • Brake switch malfunction<br>• Poor connection of the brake switch connector or the PCM connector<br>• Short to the power supply between brake switch terminal D and PCM connector terminal 1AB<br>• Open circuit between brake switch terminal D and PCM connector terminal 1AB<br>• Open circuit between the battery positive terminal and brake switch terminal B<br>• PCM malfunction |



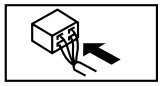

BRAKE SWITCH
WIRING HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY HIGH INPUT OR LOW INPUT**<br>• Connect the M-MDS to the DLC-2.<br>• Access the BOO PID.<br>• Verify the BOO PID during brake pedal operation.<br>• Is the BOO PID always off? | Yes | Go to the next step. |
| | | No | Go to Step 10. |
| 4 | **INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the brake switch connector.<br>• Inspect for poor connection (such as damaged pulled-out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 14. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **CLASSIFY BRAKE SWITCH OR CIRCUIT**<br>• Connect the M-MDS to the DLC-2.<br>• Access the BOO PID.<br>• Connect a jumper wire between brake switch terminal B and D (harness-side).<br>• Is the BOO PID on? | Yes | Go to the next step. |
| | | No | Go to Step 7. |
| 6 | **INSPECT BRAKE SWITCH**<br>• Perform the brake switch inspection. (See04-11-9 BRAKE SWITCH INSPECTION.)<br>• Is the brake switch normal? | Yes | Go to Step 14. |
| | | No | Replace the brake switch, then go to Step 14. |
| 7 | **INSPECT BRAKE SWITCH POWER CIRCUIT FOR OPEN CIRCUIT**<br>• Measure the voltage between brake switch connector terminal B (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the brake switch power circuit for an open circuit, then go to Step 14. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 14. |
| | | No | Go to the next step. |
| 9 | **INSPECT BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between brake switch terminal D (harness-side) and PCM terminal 1AB (harness-side).<br>• Is there continuity? | Yes | Repair or replace the wiring harness for an open circuit, then go to Step 14. |
| | | No | Go to Step 14. |
| 10 | **INSPECT BRAKE SWITCH CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect brake switch connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there malfunction? | Yes | Repair or replace the terminal, then go to Step 14. |
| | | No | Go to the next step. |
| 11 | **CLASSIFY BRAKE SWITCH OR CIRCUIT**<br>• Connect the M-MDS to the DLC-2.<br>• Access the BOO PID.<br>• Verify that the BOO PID changes from on to off when the brake switch connector is disconnected.<br>• Does BOO PID change from on to off? | Yes | Go to the next step. |
| | | No | Go to Step 13. |
| 12 | **INSPECT BRAKE SWITCH**<br>• Perform the brake switch inspection. (See04-11-9 BRAKE SWITCH INSPECTION.)<br>• Is the brake switch normal? | Yes | Go to Step 14. |
| | | No | Replace the brake switch, then go to Step 14. |
| 13 | **INSPECT BRAKE SWITCH SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Measure the voltage between brake switch connector terminal D (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a short to power supply, then go to Step 14. |
| | | No | Go to the next step. |
| 14 | **VERIFY TROUBLESHOOTING OF DTC P0703 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive vehicle at **30 km/h {18.6 mph} or more.**<br>• Depress and release brake pedal **more than 8 times** while driving the vehicle.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 15 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



### DTC P1260[L3 WITH TC]

id010239815600

| DTC P1260 | Immobilizer system problem |
|---|---|
| DETECTION CONDITION | • The instrument cluster detects an immobilizer system malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Immobilizer system malfunction<br>• PCM malfunction |

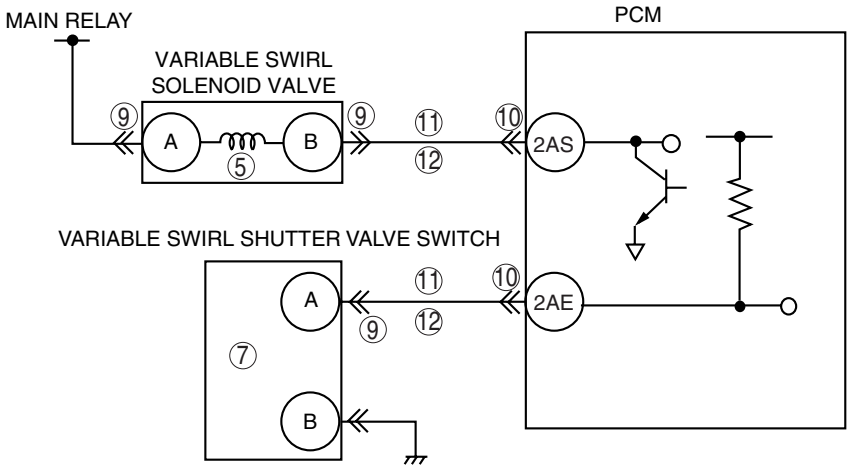
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY STORED DTC IN INSTRUMENT CLUSTER**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Verify stored DTCs in instrument cluster.<br>• Are DTCs stored? | Yes | Go to the applicable DTC inspection. |
| | | No | Go to the next step. |
| 4 | **VERIFY TROUBLESHOOTING OF DTC P1260 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine or perform the KOEO self-test with M-MDS.<br>• Is PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

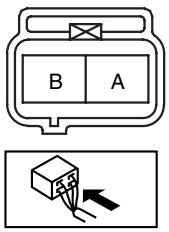
## DTC P2004[L3 WITH TC]

id010239810200

| DTC P2004 | Variable swirl control system shutter valve stuck open |
|---|---|
| DETECTION CONDITION | • PCM monitors the mass variable swirl shutter valve position using the variable swirl shutter valve switch. If the PCM turns variable swirl solenoid valve on but variable swirl shutter valve position still remains open (variable swirl shutter valve switch is on), the PCM determines that the variable swirl shutter valve is stuck open.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Variable swirl shutter valve actuator malfunction (stuck open)<br>• Misconnected or pulled out vacuum hose<br>• Variable swirl shutter valve switch malfunction<br>• Variable swirl solenoid valve malfunction<br>• Connector or terminal malfunction<br>• Open circuit in the wiring harness between variable swirl solenoid valve terminal B and PCM terminal 2AS<br>• Short to power in the wiring harness between variable swirl solenoid valve terminal B and PCM terminal 2AS<br>• Open circuit in the wiring harness between variable swirl shutter valve switch terminal A and PCM terminal 2AE<br>• Short to power in the wiring harness between variable swirl shutter valve switch terminal A and PCM terminal 2AE<br>• PCM malfunction |

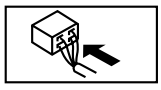



VARIABLE SWIRL SOLENOID VALVE WIRING HARNESS SIDE CONNECTOR

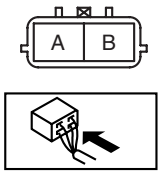



PCM WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



VARIABLE SWIRL SHUTTER VALVE SWITCH WIRING HARNESS SIDE CONNECTOR



**Diagnostic procedure**

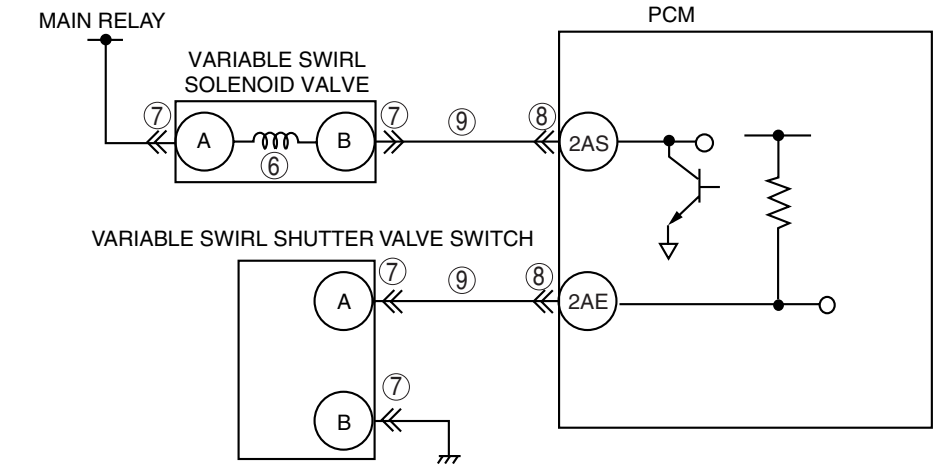
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Drive the vehicle under the following conditions:<br>— Engine coolant temperature is **above 63 °C {145 °F}.**<br>— Engine speed: **below 3,750 rpm**<br>— Throttle opening angle is as follows:<br>• Engine speed **below 1,500 rpm: above 35%**<br>• Engine speed **between 1,500— 2,500 rpm: between 25— 35%**<br>• Engine speed **above 2,500: below 25%**<br>• Is the PENDING CODE for this DTC present? | Yes | Go to the next step. |
| | | No | Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 4 | **VERIFY IF STORED OTHER DTCs STORED**<br>• Verify stored DTCs using the M-MDS.<br>• Is DTC P2088 or P2089 present? | Yes | Go to the appropriate DTC troubleshooting procedures. |
| | | No | Go to the next step. |
| 5 | **INSPECT VARIABLE SWIRL SOLENOID VALVE**<br>• Perform “VARIABLE SWIRL SOLENOID VALVE INSPECTION”. (See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the variable swirl solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace variable swirl solenoid valve, then go to Step 13. |
| 6 | **INSPECT VARIABLE SWIRL SHUTTER VALVE ACTUATOR**<br>• Perform “VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION”. (See01-13-13 VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is the variable swirl shutter valve actuator normal? | Yes | Go to the next step. |
| | | No | Replace the intake manifold, then go to Step 13. |
| 7 | **INSPECT VARIABLE SWIRL SHUTTER VALVE SWITCH**<br>• Perform the “VARIABLE SWIRL SHUTTER VALVE SWITCH INSPECTION”. (See01-13-13 VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is the variable swirl shutter valve switch normal? | Yes | Go to the next step. |
| | | No | Replace the intake manifold, then go to Step 13. |
| 8 | **VERIFY CONNECTION OF VACUUM HOSE ROUTING**<br>• Verify that the vacuum hoses are connected properly.<br>• Are the vacuum hoses connected properly? | Yes | Go to the next step. |
| | | No | Connect the vacuum hoses properly, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | **INSPECT VARIABLE SWIRL SOLENOID VALVE OR VARIABLE SWIRL SHUTTER VALVE SWICTH CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the variable swirl solenoid valve connector and variable swirl shutter valve switch connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 13. |
| | | No | Go to the next step. |
| 10 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 13. |
| | | No | Go to the next step. |
| 11 | **INSPECT VARIABLE SWIRL SOLENOID VALVE OR VARIABLE SWIRL SHUTTER VALVE SW SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between the following terminals:<br>— Variable swirl solenoid valve terminal B (harness-side) and PCM terminal 2AS (harness-side).<br>— Variable swirl shutter valve sw terminal A (harness-side) and PCM terminal 2AE (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 13. |
| 12 | **INSPECT VARIABLE SWIRL SOLENOID VALVE OR VARIABLE SWIRL SHUTTER VALVE SWITCH CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Disconnect the variable swirl solenoid valve connector and variable swirl shutter valve switch connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between the following terminals and body ground.<br>— PCM terminal 2AS (harness-side).<br>— PCM terminal 2AE (harness-side).<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a short to power supply, then go to the next step. |
| | | No | Go to the next step. |
| 13 | **VERIFY TROUBLESHOOTING OF DTC P2004 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Start the engine.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Drive the vehicle under following conditions:<br>— Engine coolant temperature is **above 63 °C {145 °F}.**<br>— Engine speed: **below 3,750 rpm**<br>— Throttle opening angle is as follows<br>• Engine speed **below 1,500 rpm: above 35%**<br>• Engine speed **between 1,500— 2,500 rpm: between 25— 35%**<br>• Engine speed **above 2,500:below 25%**<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM INSPECTION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 14 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

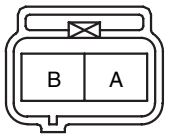
## DTC P2006[L3 WITH TC]

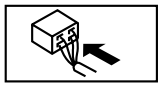
id010239810300

| DTC P2006 | Variable swirl control system shutter valve stuck closed |
|---|---|
| DETECTION CONDITION | • PCM monitors the mass variable swirl shutter valve position using the variable swirl shutter valve switch. If PCM turns the variable swirl solenoid valve off but the variable swirl position still remains closed (variable swirl shutter valve switch is off), the PCM determines that the variable swirl shutter valve is stuck closed.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • ECT sensor malfunction<br>• TP sensor malfunction<br>• CKP sensor malfunction<br>• Connector or terminal malfunction<br>• Variable swirl solenoid valve malfunction<br>• Variable swirl shutter valve malfunction (stuck closed)<br>• Variable swirl shutter valve actuator malfunction (stuck closed).<br>• Short to ground circuit between variable swirl solenoid valve terminal B and PCM terminal 2AS<br>• Short to ground in the wiring harness between variable swirl shutter valve switch terminal A and PCM terminal 2AE<br>• PCM malfunction |



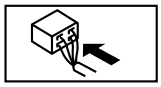

VARIABLE SWIRL SOLENOID VALVE WIRING HARNESS SIDE CONNECTOR



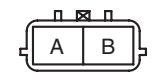



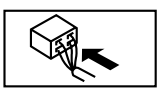
PCM WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



VARIABLE SWIRL SHUTTER VALVE SWITCH WIRING HARNESS SIDE CONNECTOR



**Diagnostic procedure**

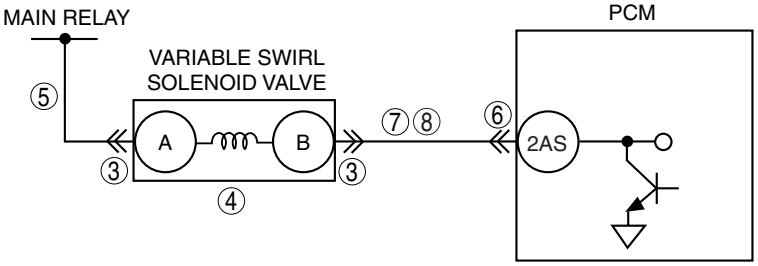
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN**<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Drive the vehicle under following conditions:<br>— Engine coolant temperature is **above 63 °C {145 °F}.**<br>— Engine speed: **below 3,750 rpm**<br>— Throttle opening angle is as follows:<br>• Engine speed **below 1,500 rpm: above 35%**<br>• Engine speed **between 1,500— 2,500 rpm: between 25— 35%**<br>• Engine speed **above 2,500: below 25%**<br>• Is the PENDING CODE for this DTC present? | Yes | Go to the next step. |
| | | No | Intermittent concern exists. Go to INTERMITTENT CONCERN TROUBLESHOOTING procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 4 | **VERIFY STORED OTHER DTCS**<br>• Verify stored DTCs using M-MDS or equipment.<br>• Is other DTC present except P0117, P0118, P0121, P0122, P0123 and/or P0335? | Yes | Go to appropriate DTC troubleshooting procedures. |
| | | No | Go to the next step. |
| 5 | **INSPECT VARIABLE SWIRL SHUTTER VALVE ACTUATOR**<br>• Perform the “Variable Swirl System Operation Inspection”. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the variable swirl shutter valve actuator normal? | Yes | Go to the next step. |
| | | No | Replace the variable swirl shutter valve actuator, then go to Step 10. |
| 6 | **INSPECT VARIABLE SWIRL SOLENOID VALVE**<br>• Perform the “variable swirl solenoid valve airflow inspection”. (See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the variable swirl solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the variable swirl solenoid valve, then go to Step 10. |
| 7 | **INSPECT VARIABLE SWIRL SOLENOID VALVE OR VARIABLE SWIRL SHUTTER VALVE SWITCH CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the variable swirl solenoid valve connector and the variable swirl shutter valve switch connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Inspect for poor connection at the PCM terminals (such as damaged, pulled-out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 10. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | **INSPECT VARIABLE SWIRL SOLENOID VALVE OR VARIABLE SWIRL SHUTTER VALVE SWITCH SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between the following terminals and body ground.<br>— PCM terminal 2AS (harness-side).<br>— PCM terminal 2AE (harness-side).<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to the next step. |
| | | No | Go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P2006 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Start the engine.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Drive the vehicle under the following conditions:<br>— Engine coolant temperature is **above 63 °C {145 °F}.**<br>— Engine speed: **below 3,750 rpm**<br>— Throttle opening angle is as follows:<br>• Engine speed **below 1,500 rpm: above 35%**<br>• Engine speed **between 1,500— 2,500 rpm: between 25— 35%**<br>• Engine speed **above 2,500: below 25%**<br>• Is the PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

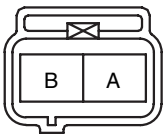
## DTC P2009[L3 WITH TC]

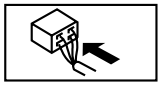
id010239810400

| DTC P2009 | Variable swirl solenoid valve control circuit low |
|---|---|
| DETECTION CONDITION | • PCM monitors the variable swirl solenoid valve control signal. If the PCM turns variable swirl solenoid valve off but the voltage still remains low, the PCM determines that the variable swirl solenoid valve control circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Poor connection of connectors at PCM and/or variable swirl solenoid valve<br>• Short to ground in the wiring harness between variable swirl solenoid valve terminal B and PCM terminal 2AS<br>• Open circuit in the wiring harness between main relay and variable swirl solenoid valve terminal A<br>• Open circuit in the wiring harness between variable swirl solenoid valve terminal B and PCM terminal 2AS<br>• Variable swirl solenoid valve malfunction<br>• PCM malfunction |



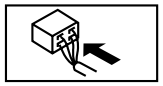

VARIABLE SWIRL SOLENOID VALVE WIRING HARNESS SIDE CONNECTOR



PCM WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

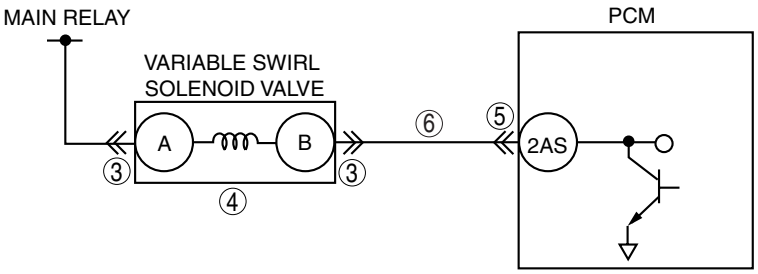
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT VARIABLE SWIRL SOLENOID VALVE CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT VARIABLE SWIRL SOLENOID VALVE**<br>• Perform the variable swirl solenoid valve inspection. (See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the variable swirl solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the variable swirl solenoid valve, then go to Step 9. |
| 5 | **INSPECT VARIABLE SWIRL SOLENOID VALVE POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the variable swirl solenoid valve connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure voltage between variable swirl solenoid valve terminal A (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection at PCM terminal 2AS. (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT VARIABLE SWIRL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between variable swirl solenoid valve terminal B (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT VARIABLE SWIRL SOLENOID VALVE CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Connect variable swirl solenoid valve connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between PCM terminal 2AS (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open or short to ground circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P2009 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

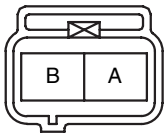
## DTC P2010[L3 WITH TC]

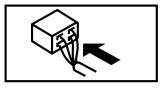
id010239810500

| DTC P2010 | Variable swirl solenoid valve control circuit high |
|---|---|
| DETECTION CONDITION | • PCM monitors the variable swirl solenoid valve control signal. If the PCM turns variable swirl solenoid valve on but the voltage still remains high, the PCM determines that the variable swirl solenoid valve control circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Poor connection of connectors at the PCM and/or the variable swirl solenoid valve<br>• Short to the power supply in the wiring harness between variable swirl solenoid valve terminal B and PCM terminal 2AS<br>• Variable swirl solenoid valve malfunction<br>• PCM malfunction |



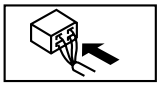

VARIABLE SWIRL SOLENOID VALVE
WIRING HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



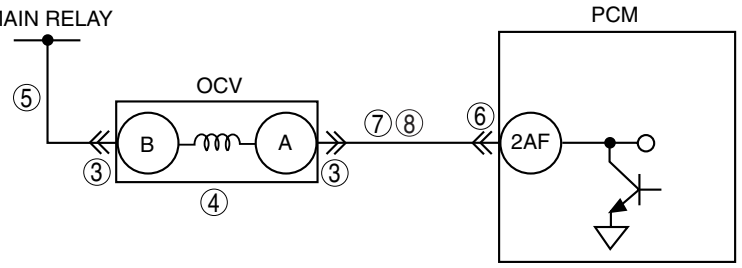
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT VARIABLE SWIRL SOLENOID VALVE CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT VARIABLE SWIRL SOLENOID VALVE**<br>• Perform variable swirl solenoid valve inspection. (See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• Is the variable swirl solenoid valve normal? | Yes | Go to the next step. |
| | | No | Replace the variable swirl solenoid valve, then go to Step 7. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection at PCM terminal 2AS. (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT VARIABLE SWIRL SOLENOID VALVE CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Remove the variable swirl solenoid valve.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure voltage between PCM terminal 2AS (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a short to power supply, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2010 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

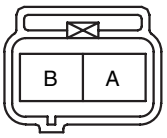
## DTC P2088[L3 WITH TC]

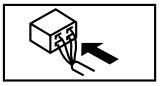
id010239810600

| DTC P2088 | OCV actuator circuit low |
|---|---|
| DETECTION CONDITION | • PCM monitors the OCV voltage. If the PCM detects that the OCV control voltage (calculated from OCV) is below the threshold voltage (calculated from battery positive voltage), the PCM determines that the OCV circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Poor connection of connectors at the PCM and/or OCV<br>• Short to ground in the wiring harness between OCV terminal A and PCM terminal 2AF<br>• Open circuit in the wiring harness between main relay and OCV terminal B<br>• Open circuit in the wiring harness between OCV terminal A and PCM terminal 2AF<br>• OCV malfunction<br>• PCM malfunction |



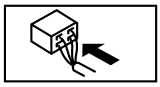

OCV
WIRING HARNESS SIDE CONNECTOR



PCM
HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



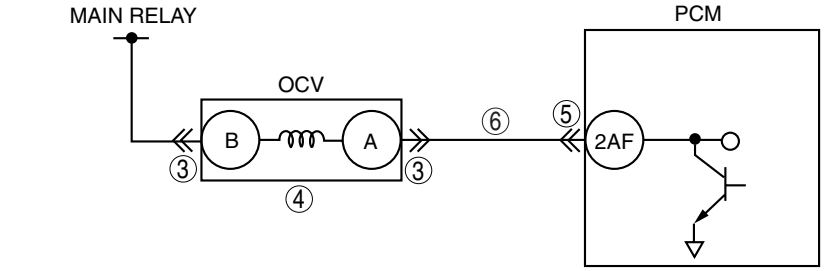
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT OCV CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **INSPECT OCV**<br>• Perform the OCV inspection. (See01-10-29 OIL CONTROL VALVE (OCV) INSPECTION[L3 WITH TC].)<br>• Is the OCV normal? | Yes | Go to the next step. |
| | | No | Replace OCV, then go to Step 9. |
| 5 | **INSPECT OCV POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the OCV connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure voltage between OCV terminal B (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 9. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection at PCM terminal 2AF. (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT OCV CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between OCV terminal A (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT OCV CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Connect the OCV connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Check for continuity between OCV terminal A (harness-side) and PCM terminal 2AF (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open or short to ground circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P2088 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch off.<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2089[L3 WITH TC]

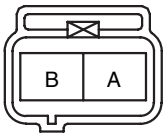
id010239810700

| DTC P2089 | OCV actuator circuit high |
|---|---|
| DETECTION CONDITION | • PCM monitors the OCV voltage. If the PCM detects that the OCV control voltage (calculated from OCV) is above the threshold voltage (calculated from battery positive voltage), the PCM determines that the OCV circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Poor connection at the PCM and/or OCV connectors<br>• Short to the power supply in the wiring harness between OCV terminal A and PCM terminal 2AF<br>• OCV malfunction<br>• PCM malfunction |

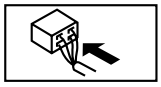


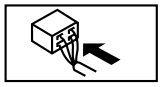

OCV
WIRING HARNESS SIDE CONNECTOR

PCM
HARNESS SIDE CONNECTOR




| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT OCV CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT OCV**<br>• Perform the OCV inspection. (See01-10-29 OIL CONTROL VALVE (OCV) INSPECTION[L3 WITH TC].)<br>• Is the OCV normal? | Yes | Go to the next step. |
| | | No | Replace the OCV, then go to Step 7. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection at PCM terminal 2AF. (such as damaged, pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT OCV CONTROL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Remove the OCV.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure voltage between PCM terminal 2AF and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a short to power supply, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2089 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch to off.<br>• Start the engine and warm it up completely.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2096[L3 WITH TC]

id010239810800

| DTC P2096 | Target A/F feedback system too lean |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the target A/F fuel trim while under target A/F feedback control. If the fuel trim is more than the specification, the PCM determines that the target A/F feedback system is too lean.<br>• Rear HO2S sensor voltage is **more than 0.1 V**<br>**Diagnostic support note**<br>• This is a continuous monitor (Fuel system).<br>• The MIL does not illuminate.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Exhaust gas leakage<br>• Rear HO2S malfunction<br>• IAT sensor malfunction<br>• ECT sensor malfunction<br>• Air suction in intake-air system<br>• Front HO2S malfunction<br>• MAF sensor malfunction<br>• Insufficient fuel line pressure<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Fuel pump malfunction<br>• Leakage fuel<br>• Improper operation ignition system<br>• Insufficient engine compression<br>• Fuel injector malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Fuel system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY REPAIR INFORMATION AVAILABILITY**<br>• Verify related service repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch off then to the ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs.<br>• Is the DTC P2177 or P2187 also present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2096 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to FREEZE FRAME DATA DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS OF REAR HO2S**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine and warm it up completely.<br>• Access O2S12 PID.<br>• Read O2S12 PID under the following accelerator pedal condition (in NEUTRAL).<br>— **More than 0.45 V** when accelerator pedal is suddenly depressed (rich condition).<br>— **Less than 0.45 V** just after release of accelerator pedal (lean condition)<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Visually inspect for the exhaust gas leakage between the TWC and rear HO2S.<br>• If there is no leakage, replace the rear HO2S.<br>(See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>Then go to Step 20. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs.<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 20. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA CONDITION**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs under the FREEZE FRAME DATA condition.<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 20. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF FRONT HO2S**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine and warm it up completely.<br>• Access the O2S11 PID.<br>• Read the O2S11 PID under following accelerator pedal condition (in NEUTRAL).<br>— **–0.1— 0.1A** when idle.<br>— **More than 0.25 mA** just after release of accelerator pedal (lean condition).<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Visually inspect for the exhaust gas leakage between the exhaust manifold and front HO2S.<br>• If there is no leakage, replace front HO2S. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>Then go to Step 20. |
| 9 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 20. |
| 10 | **INSPECT INTAKE-AIR SYSTEM FOR EXCESSIVE AIR SUCTION**<br>• Visually inspect the hose in intake-air system for looseness, cracks or damages.<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part, then go to Step 20. |
| | | No | Go to the next step. |
| 11 | **INSPECT IGNITION COIL WIRING HARNESSES**<br>• Inspect the ignition coil related wiring harness condition (intermittent open or short circuit) for all cylinders.<br>• Are wiring harness conditions normal? | Yes | Go to the next step. |
| | | No | Repair the wiring harnesses, then go to Step 20. |
| 12 | **INSPECT IGNITION SYSTEM OPERATION**<br>• Perform the spark test. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to spark test result.<br>Then go to Step 20. |
| 13 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression. (See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Go to the next step. |
| | | No | Overhaul the engine, then go to Step 20. |
| 14 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 18. |
| | | No | Go to the next step. |
| 15 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 17. |
| 16 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 18. |
| | | No | Replace the fuel delivery pipe, then go to Step 20. |
| 17 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump.<br>• Monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 20. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 18 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to Step 20. |
| 19 | **INSPECT FUEL INJECTOR**<br>• Inspect the fuel injector. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the fuel injector, then go to the next step. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 20 | **VERIFY TROUBLESHOOTING OF DTC P2096 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 21 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2097[L3 WITH TC]

id010239810900

| DTC P2097 | Target A/F feedback system too rich |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the target A/F fuel trim while under target A/F feedback control. If the fuel trim is less than specification, the PCM determines that the target A/F feedback system is too rich.<br>**Diagnostic support note**<br>• This is a continuous monitor. (Fuel system)<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Exhaust gas leakage<br>• Rear HO2S malfunction<br>• IAT sensor malfunction<br>• ECT sensor malfunction<br>• Front HO2S malfunction<br>• Excessive fuel line pressure<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Fuel pump malfunction<br>• Purge valve malfunction<br>• Insufficient engine compression<br>• PCM malfunction |

**Diagnostic procedure**

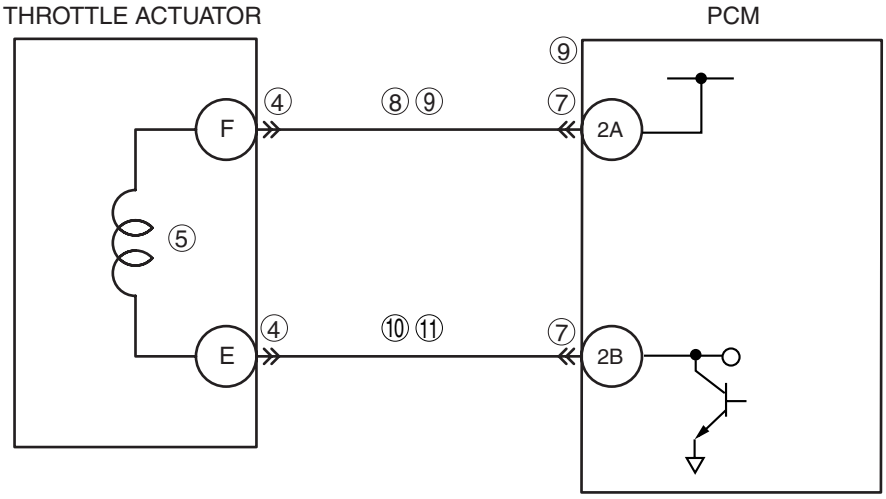
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Fuel system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY REPAIR INFORMATION AVAILABILITY**<br>• Verify related service repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch off, then to the ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs.<br>• Is the DTC P2178 or P2188 also present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2097 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to FREEZE FRAME DATA DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS OF REAR HO2S**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine and warm it up completely.<br>• Access the O2S12 PID.<br>• Read the O2S12 PID under following accelerator pedal condition (in NEUTRAL).<br>— **More than 0.45 V** when accelerator pedal is suddenly depressed (rich condition).<br>— **Less than 0.45 V** just after release of accelerator pedal (lean condition)<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Visually inspect for the exhaust gas leakage between TWC and rear HO2S.<br>• If there is no leakage, replace rear HO2S.<br>(See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>Then go to Step 15. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs:<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 15. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA CONDITION**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs under FREEZE FRAME DATA condition.<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 15. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF FRONT HO2S**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine and warm it up completely.<br>• Access the O2S11 PID.<br>• Read the O2S11 PID under following accelerator pedal condition (in NEUTRAL).<br>— **–0.1— 0.1A** when idle<br>— **More than 0.25 mA** just after release of accelerator pedal (lean condition).<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Visually inspect for exhaust gas leakage between the exhaust manifold and front HO2S.<br>• If there is no leakage, replace front HO2S. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>Then go to Step 15. |
| 9 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 14. |
| | | No | Go to the next step. |
| 10 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 12. |
| 11 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 14. |
| | | No | Replace the fuel delivery pipe, then go to Step 15. |
| 12 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump.<br>• Monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 15. |
| | | No | Go to the next step. |
| 13 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. Then go to Step 15. |
| 14 | **INSPECT LONG TERM FUEL TRIM**<br>• Connect the M-MDS to the DLC_2.<br>• Access LONGFT1 PID.<br>• Compare the LONGFT1 PID with recorded FREEZE FRAME DATA at Step 1.<br>• Is the LONGFT1 PID above FREEZE FRAME DATA? | Yes | Inspect the purge valve. (See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>• If there is any malfunction, replace the purge valve.<br>Then go to the next step. |
| | | No | Go to the next step. |
| 15 | **VERIFY TROUBLESHOOTING OF DTC P2097 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 16 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

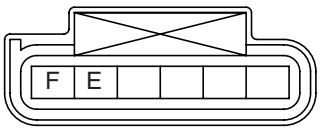
## DTC P2100[L3 WITH TC]

id010239811000

| DTC P2100 | Throttle actuator circuit open |
|---|---|
| DETECTION CONDITION | • PCM monitors the electronic throttle valve motor current. If the PCM detects that the electronic throttle valve motor current is below the threshold current, the PCM determines that the electronic throttle valve motor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Throttle valve motor malfunction<br>• Open circuit between throttle body terminal F and PCM terminal 2A<br>• Open circuit between throttle body terminal E and PCM terminal 2B<br>• Short to the power supply between throttle body terminal E and PCM terminal 2B<br>• Short to the power supply between throttle body terminal F and PCM terminal 2A<br>• Short to the ground between throttle body terminal E and PCM terminal 2B<br>• Short to the ground between throttle body terminal F and PCM terminal 2A<br>• Poor connection of throttle body connector or PCM connector<br>• PCM malfunction |

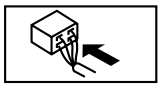


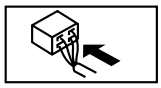

THROTTLE BODY
HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **CLASSIFY INTERMITTENT CONCERN OR CONTINUOUS CONCERN**<br>• Clear the DTC using the M-MDS.<br>• Start the engine and let it idle.<br>• Is the same PENDING CODE present? | Yes | Go to the next step. |
| | | No | Go to INTERMITTENT CONCERNS TROUBLESHOOTING procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 4 | **INSPECT THROTTLE BODY CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the throttle body connector.<br>• Check for poor connection (such as damaged, pulled out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 12. |
| | | No | Go to the next step. |
| 5 | **INSPECT THROTTLE VALVE ELECTRICAL MALFUNCTION**<br>• Measure resistance between throttle body terminal E and F (part-side).<br>• Is resistance approx.**1.3 ohms?** | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to Step 12. |
| 6 | **CLASSIFY MALFUNCTION ET POWER SUPPLY CIRCUIT OR CONTROL CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between throttle body terminal F (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Malfunction at control circuit.<br>Go to the next step. |
| | | No | Malfunction at power supply circuit.<br>Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Check for poor connection (such as damaged, pulled out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair terminal, then go to Step 12. |
| | | No | Go to the next step. |
| 8 | **INSPECT POWER CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch to off.<br>• Check for continuity between throttle body terminal F (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness to a short to ground, then go to Step 12. |
| | | No | Go to the next step. |
| 9 | **INSPECT POWER CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch to off.<br>• Check for continuity between throttle body terminal F (harness-side) and PCM terminal 2A (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 12. |
| 10 | **INSPECT CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Turn the ignition switch to off.<br>• Check for continuity between throttle body terminal E (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 12. |
| | | No | Go to the next step. |
| 11 | **INSPECT CONTROL CIRCUIT MALFUNCTION FOR OPEN CIRCUIT**<br>• Check for continuity between throttle body terminal E (harness-side) and PCM terminal 2B (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to the next step. |
| 12 | **VERIFY TROUBLESHOOTING OF DTC P2100 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 13 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



## DTC P2101[L3 WITH TC]

id010239811100

| DTC P2101 | Throttle actuator circuit range/performance |
|---|---|
| DETECTION CONDITION | • If the PCM detects any of the following conditions, the PCM determines that the throttle circuit has a malfunction.<br>— Default throttle angle that the PCM stored and the throttle angle with drive-by-wire-relay off is not significant.<br>— Voltage from drive-by-wire-relay is too high or too low<br>— PCM detects large voltage difference between the drive-by-wire-relay and the main relay<br>— PCM internal malfunction<br>**Diagnostic support note**<br>• This is a continuous monitor.<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Drive-by-wire-relay and related circuit malfunction<br>• Main relay and related circuit malfunction<br>• Throttle position sensor No.1 and related circuit malfunction<br>• Throttle position sensor No.2 and related circuit malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING AND STORED DTCS**<br>• Turn ignition switch to OFF, then ON (Engine off).<br>• Verify pending and stored DTCs using the M-MDS.<br>• Are any DTCs present? | Yes | Go to appropriate DTC troubleshooting procedure. |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2101 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged, pulled out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 22. |
| | | No | Go to the next step. |
| 6 | **INSPECT MAIN RELAY OUTPUT VOLTAGE**<br>• Turn the ignition switch to off.<br>• Connect the PCM connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between PCM terminal 1BE and body ground.<br>• Is the voltage **B+?** | Yes | Go to Step 13. |
| | | No | Go to the next step. |

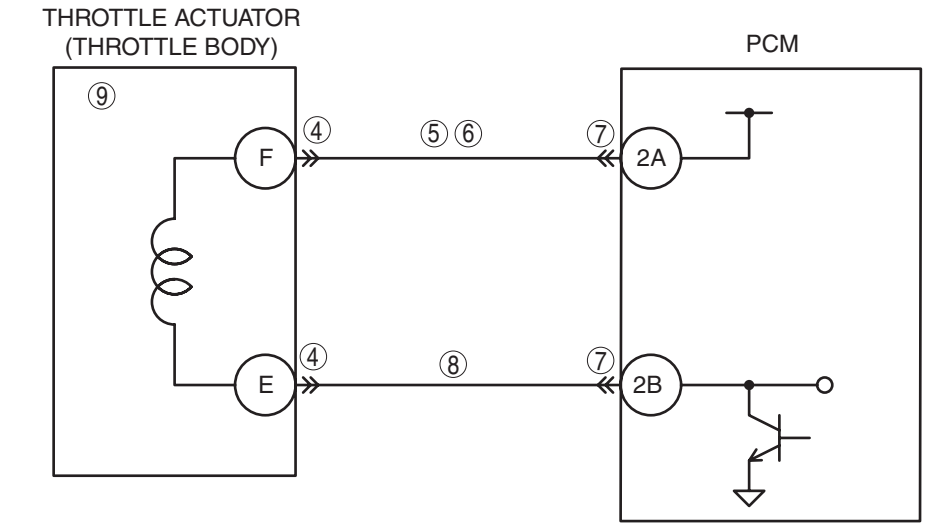
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT MAIN RELAY CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the main relay.<br>• Inspect for poor connection (such as damaged, pulled out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 22. |
| | | No | Go to the next step. |
| 8 | **INSPECT POWER SUPPLY OF MAIN RELAY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between main relay terminal D (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |
| 9 | **INSPECT POWER SUPPLY FOR CONTROL CIRCUIT OF MAIN RELAY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between main relay terminal A (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |
| 10 | **INSPECT MAIN RELAY**<br>• Inspect the main relay. (See09-21-4 RELAY INSPECTION.)<br>• Is the main relay normal? | Yes | Go to the next step. |
| | | No | Replace the main relay, then go to Step 22. |
| 11 | **INSPECT POWER CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch to off.<br>• Disconnect the main relay and the PCM connector.<br>• Check for continuity between main relay terminal C (harness-side) and PCM terminal 1BE (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |
| 12 | **INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Check for continuity between main relay terminal E (harness-side) and PCM terminal 1AT (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |
| 13 | **INSPECT DRIVE-BY-WIRE-RELAY OUTPUT VOLTAGE**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between PCM terminal 1BF (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a short to power supply, then go to Step 22. |
| 14 | **INSPECT DRIVE-BY-WIRE-RELAY CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the drive-by-wire-relay.<br>• Check drive-by-wire-relay connector (harness-side) for poor connection (such as damaged, pulled out terminals, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 22. |
| | | No | Go to the next step. |
| 15 | **INSPECT POWER SUPPLY OF DRIVE-BY-WIRE-RELAY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between drive-by-wire-relay terminal D (harness-side) and body ground. | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 16 | **INSPECT POWER SUPPLY FOR CONTROL CIRCUIT OF DRIVE-BY-WIRE-RELAY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between drive-by-wire-relay terminal E (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit between drive-by-wire-relay terminal E and main relay terminal C, then go to Step 22. |
| 17 | **INSPECT DRIVE-BY-WIRE-RELAY**<br>• Inspect the drive-by-wire-relay. (See09-21-4 RELAY INSPECTION.)<br>• Is the drive-by-wire-relay normal? | Yes | Go to the next step. |
| | | No | Replace the drive-by-wire-relay, then go to Step 22. |
| 18 | **INSPECT POWER CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch to off.<br>• Check for continuity between drive-by-wire-relay terminal C (harness-side) and PCM terminal 1BF (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |
| 19 | **INSPECT CONTROL CIRCUIT FOR OPEN CIRCUIT**<br>• Check for continuity between drive-by-wire-relay A (harness-side) and PCM terminal 1AX (harness-side). | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 22. |
| 20 | **INSPECT THROTTLE POSITION SENSOR NO.1 OUTPUT VOLTAGE**<br>• Turn the ignition switch to off.<br>• Connect the PCM connector.<br>• Turn ignition switch to the ON position (Engine off).<br>• Check voltage between PCM terminal 2AK and body ground.<br>• Is the voltage **0.40— 0.60 V?** | Yes | Go to the next step. |
| | | No | Check the throttle position sensor No.1 and related circuits and terminal. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>Repair or replace if necessary, then go to Step 22. |
| 21 | **INSPECT THROTTLE POSITION SENSOR NO.2 OUTPUT VOLTAGE**<br>• Turn ignition switch to the ON position (Engine off).<br>• Check the voltage between PCM terminal 2AL and body ground.<br>• Is the voltage **4.40— 4.60 V?** | Yes | Go to the next step. |
| | | No | Check the throttle position sensor No.2 and related circuits and terminal. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>Repair or replace as necessary, then go to the next step. |
| 22 | **VERIFY TROUBLESHOOTING OF DTC P2101 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and run it at idle.<br>• Turn ignition switch to OFF then ON (Engine off).<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 23 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

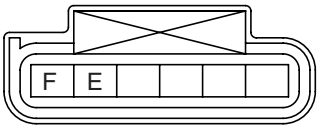
## DTC P2102[L3 WITH TC]

id010239811200

| DTC P2102 | Throttle actuator circuit low input |
|---|---|
| DETECTION CONDITION | • PCM monitors the throttle actuator circuit current. If the PCM detects that the throttle actuator circuit current is excessively low, the PCM determines that the throttle actuator circuit was a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Open circuit between throttle body terminal F and PCM terminal 2A<br>• Open circuit between throttle body terminal E and PCM terminal 2B<br>• Short to ground circuit between throttle body terminal F and PCM terminal 2A<br>• Short to ground circuit between throttle body terminal E and PCM terminal 2B<br>• Poor connection of throttle body or PCM connector<br>• Throttle actuator malfunction<br>• PCM malfunction |

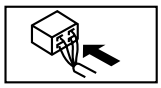


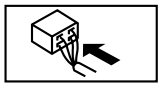

THROTTLE BODY
HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

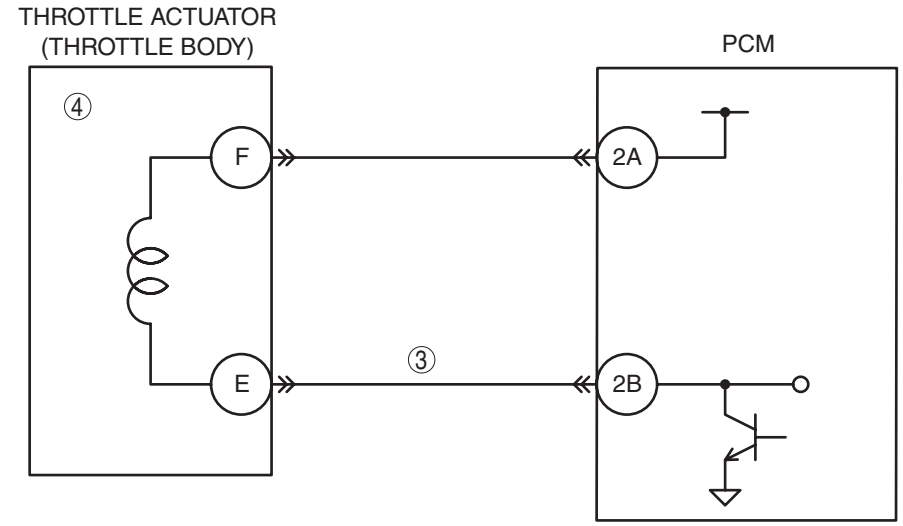
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING CODE AND STORED DTCS**<br>• Turn ignition switch to OFF, then ON (Engine off).<br>• Verify pending and/or stored DTCs using the M-MDS.<br>• Is the DTC P2100 also present? | Yes | Go to appropriate the DTC troubleshooting procedure, then go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT THROTTLE BODY CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the throttle body connector.<br>• Inspect for poor connection (such as damaged, pulled-put pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT POWER SUPPLY CIRCUIT OF THROTTLE ACTUATOR FOR OPEN CIRCUIT**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between throttle body terminal F (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 6 | **INSPECT POWER SUPPLY CIRCUIT OF THROTTLE ACTUATOR FOR SHORT TO GROUND**<br>• Turn the ignition switch to off.<br>• Check continuity between throttle body terminal F (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground circuit, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT CONTROL CIRCUIT OF THROTTLE ACTUATOR FOR OPEN CIRCUIT**<br>• Turn the ignition switch to off.<br>• Check for continuity between throttle body terminal E (harness-side) and PCM terminal 2B (harness-side).<br>• Is there continuity? | Yes | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **INSPECT THROTTLE ACTUATOR**<br>• Inspect the throttle actuator. (See01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P2102 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

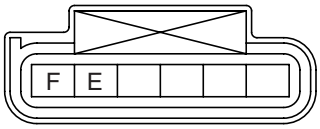
## DTC P2103[L3 WITH TC]

id010239811300

| DTC P2103 | Throttle actuator circuit high input |
|---|---|
| DETECTION CONDITION | • PCM monitors the throttle actuator circuit current. If the PCM detects that the throttle actuator circuit current is excessively high, the PCM determines that the electronic throttle actuator circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Short to the power supply between throttle body terminal E and PCM terminal 2B<br>• Throttle actuator malfunction<br>• PCM malfunction |

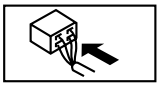


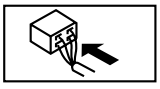

THROTTLE BODY
HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |





### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT CONTROL CIRCUIT OF THROTTLE ACTUATOR FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to off.<br>• Disconnect the throttle body and PCM connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between throttle body terminal E (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness for a short to power supply, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT THROTTLE ACTUATOR**<br>• Inspect the throttle actuator. (See01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P2103 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2107[L3 WITH TC]

id010239811400

| DTC P2107 | Throttle actuator control module processor problem |
|---|---|
| DETECTION CONDITION | • Throttle actuator control module internal processor error<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Throttle actuator control module internal processor malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF P2107 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

**DTC P2108[L3 WITH TC]**

id010239811500

| DTC P2108 | Throttle actuator control module performance problem |
|---|---|
| DETECTION CONDITION | • If the PCM detects either of the following conditions, the PCM determines that throttle actuator control system has a malfunction.<br>— TP sensor power supply voltage **below 4.4 V**<br>— TP sensor No.1 output voltage **below 0.20 V or above 4.85 V** (DTC P0122 or P0123)<br>— TP sensor No.2 output voltage **below 0.20 V or above 4.85 V** (DTC P0222 or P0223)<br>— PCM internal circuit for TP sensor No.1 input circuit malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • TP sensor No.1 malfunction<br>• TP sensor No.2 malfunction<br>• Connector or terminal malfunction<br>• Open circuit between throttle body terminal A and PCM terminal 2AK<br>• Short to ground between throttle body terminal A and PCM terminal 2AK<br>• Open circuit between throttle body terminal B and PCM terminal 2AO<br>• Open circuit between throttle body terminal D and PCM terminal 2AP<br>• Short to the power supply between throttle body terminal A and PCM terminal 2AK<br>• Short to the power supply between throttle body terminal C and PCM terminal 2AL<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE AND STORED DTCS**<br>• Turn ignition switch to OFF, then ON (Engine off).<br>• Verify pending and/or stored DTCs using the M-MDS.<br>• Is the DTC P0122, P0123, P0222 or P0223 also present? | Yes | Go to appropriate DTC troubleshooting procedure, then go to Step 7. |
| | | No | Go to the next step. |
| 4 | **VERIFY INTERMITTENT MALFUNCTION AT TP SENSOR NO.1 CIRCUIT**<br>• Perform the INTERMITTENT TROUBLESHOOTING procedure to TP sensor No.1 related harnesses and connectors. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Repair or replace malfunctioning part, according to inspection result, the go to Step 7. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY INTERMITTENT MALFUNCTION AT TP SENSOR NO.2 CIRCUIT**<br>• Perform the INTERMITTENT TROUBLESHOOTING procedure to TP sensor No.2 related harnesses and connectors. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].)<br>• Is there any malfunction | Yes | Repair or replace malfunctioning part, according to inspection result, the go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT TP SENSOR**<br>• Inspect the TP sensor.<br>• Is the TP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the throttle body, then go to nest step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2108 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn ignition switch to the ON position (Engine off).<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



### DTC P2119[L3 WITH TC]

id010239811600

| DTC P2119 | Throttle actuator control throttle body range/performance problem |
|---|---|
| DETECTION CONDITION | • The PCM compares the TP with the default TP when the ignition switch is off. If the TP is higher than the default TP, the PCM determines that there is a throttle actuator control throttle body range/performance problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunctioning condition in the first drive cycles.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Throttle actuator malfunction<br>• Throttle valve malfunction<br>• PCM malfunction |

**Diagnostic procedure**

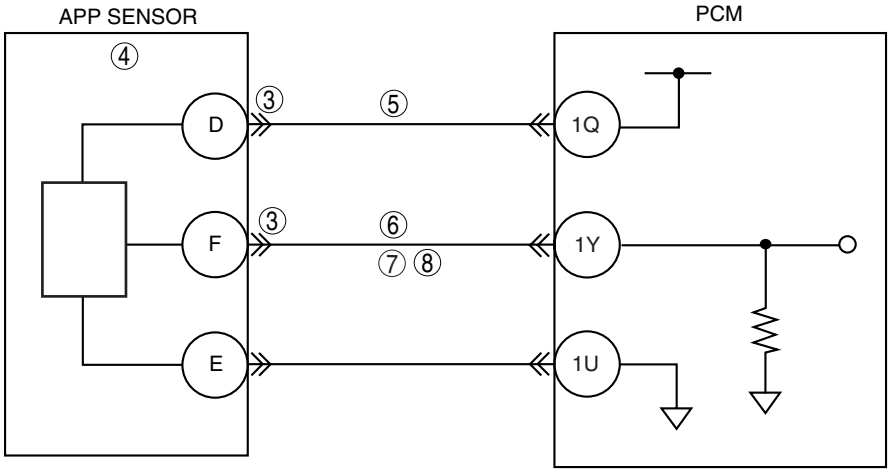
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT THROTTLE ACTUATOR**<br>• Inspect the throttle actuator. (See01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the throttle body, then go to Step 5. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT TP SENSOR**<br>• Inspect the TP sensor. (See01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the TP sensor, then go to the next step. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY TROUBLESHOOTING OF DTC P2119 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Turn the ignition switch to the ON position (Engine off), then off.<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-02-10 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

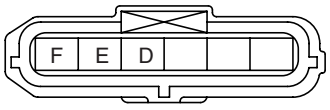
### DTC P2122[L3 WITH TC]

id010239811700

| DTC P2122 | Accelerator pedal position (APP) sensor No.1 circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the APS No.1 signal. If the PCM detects that the APP sensor No.1 voltage is **below 0.2** V, the PCM determines that the APP sensor No.1 circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • APP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between APP sensor terminal F and PCM terminal 1Y<br>• Short to ground circuit between APP sensor terminal F and PCM terminal 1Y<br>• Open circuit between APP sensor terminal D and PCM terminal 1Q<br>• Short to ground between APP sensor terminal D and PCM terminal 1Q |

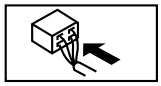


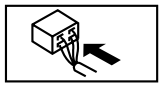

APP SENSOR
WIRING HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |





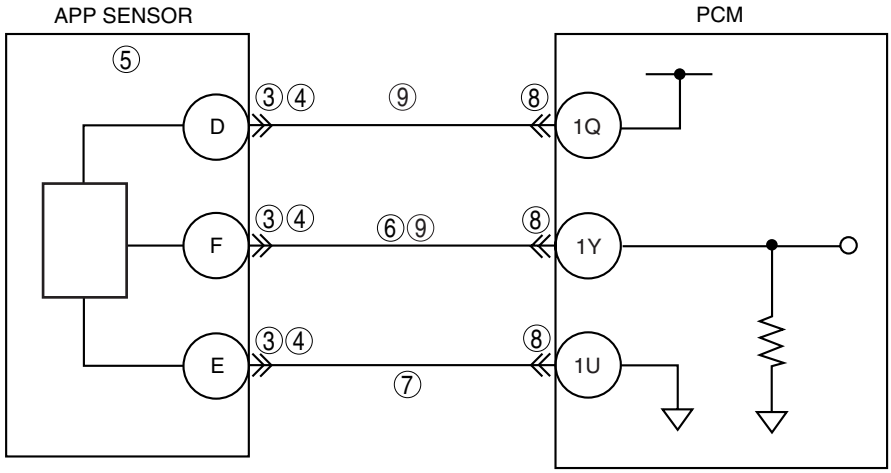
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY APP SENSOR OR HARNESS MALFUNCTION**<br>• Connect the M-MDS.<br>• Access the APP1 PID.<br>• Disconnect the throttle body connector.<br>• Connect a jumper wire between APP sensor terminals D and F (harness-side).<br>• Is the PID **approx. 100%?** | Yes | Go to the next step. |
| | | No | Go to step 5. |
| 4 | **INSPECT APP SENSOR**<br>• Perform the APP sensor inspection. (See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the APP sensor normal? | Yes | Inspect for poor APP sensor connector terminal D connection. Repair or replace if necessary, then go to Step 9. |
| | | No | Replace the APP sensor, then go to Step 9. |
| 5 | **INSPECT POWER SUPPLY CIRCUIT VOLTAGE AT APP SENSOR CONNECTOR**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage at APP sensor terminal D (harness-side).<br>• Is the voltage **within 4.5— 5.5 V?** | Yes | Go to the next step. |
| | | No | Repair or replace open circuit between APP sensor connector terminal D and PCM connector terminal 1Q (harness-side).<br>Then, then go to Step 9. |
| 6 | **VERIFY APP1 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect continuity between APP sensor terminal D and body ground.<br>• Is this continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY APP1 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch to off.<br>• Inspect continuity between APP sensor terminal F (harness-side) and PCM terminal 1Y (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 9. |
| 8 | **VERIFY APP1 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between APP sensor terminal F (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P2122 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

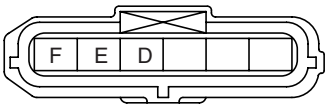
## DTC P2123[L3 WITH TC]

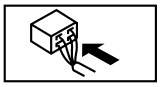
id010239811800

| DTC P2123 | Accelerator pedal position (APP) sensor No.1 circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the APP sensor No.1 signal. If the PCM detects that the APP sensor No.1 voltage is **above 4.5 V**, the PCM determines that the APP sensor No.1 circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • APP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between APP sensor terminal E and PCM terminal 1U<br>• Open circuit between APP sensor terminal F and PCM terminal 1Y<br>• Short to power supply circuit between APP sensor terminal F and PCM terminal 1Y |



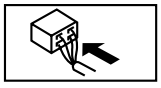

APP SENSOR
WIRING HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



### Diagnostic procedure

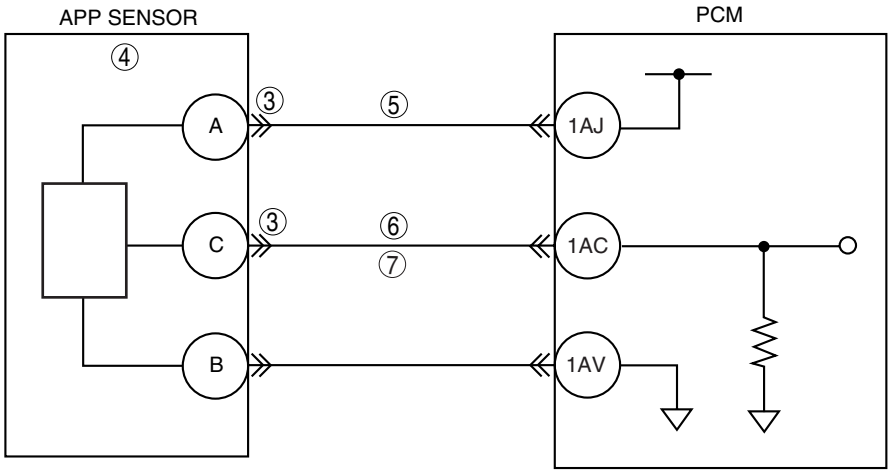
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT APP SENSOR CONNECTOR**<br>• Turn the ignition switch to off.<br>• Verify that the APP sensor connector is connected securely.<br>• Is the connector normal? | Yes | Go to the next step. |
| | | No | Connect the connector securely, then go to Step 10. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the APP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the suspected terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT APP SENSOR**<br>• Perform the APP sensor inspection. (See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the APP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the APP sensor, then go to Step 10. |
| 6 | **INSPECT APP1 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between APP sensor terminal F (harness-side) and body ground.<br>• Is the voltage **above 4.8 V?** | Yes | Repair or replace a short to power supply. Then, go to Step 10. |
| | | No | Go to the next step. |
| 7 | **VERIFY APP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the PCM connector.<br>• Inspect for continuity between APP sensor terminal E (harness side) and PCM terminal 1U (harness side).<br>• Is there continuity? | Yes | Repair or replace for an open circuit between APP sensor terminal F (harness-side) and PCM connector terminal 1Y (harness-side). Then, go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **VERIFY TP SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY CIRCUIT**<br>• Inspect for continuity between throttle body terminals D and F (harness side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P2123 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

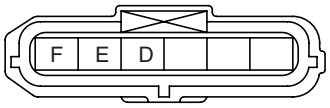
## DTC P2127[L3 WITH TC]

id010239811900

| DTC P2127 | Accelerator pedal position (APP) sensor No.2 circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the APP sensor No.2 signal. If the PCM detects that the APP sensor No.2 voltage is **below 0.2 V**, the PCM determines that the APP sensor No.2 circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • APP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between APP sensor terminal C and PCM terminal 1AC<br>• Short to ground circuit between APP sensor terminal C and PCM terminal 1AC<br>• Open circuit between APP sensor terminal A and PCM terminal 1AJ |

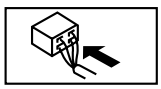


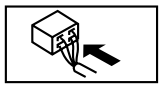

APP SENSOR
WIRING HARNESS SIDE CONNECTOR




PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |





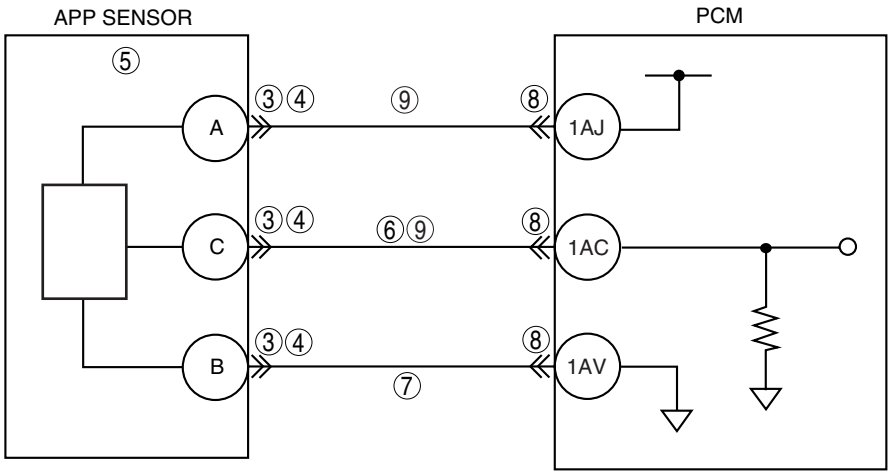
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **CLASSIFY APP SENSOR OR HARNESS MALFUNCTION**<br>• Connect the M-MDS.<br>• Access the APP2 PID.<br>• Disconnect the throttle body connector.<br>• Connect a jumper wire between APP sensor terminals A and C (harness-side).<br>• Is the PID **approx. 100%?** | Yes | Go to the next step. |
| | | No | Go to step 5. |
| 4 | **INSPECT APP SENSOR**<br>• Perform the APP sensor inspection. (See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the APP sensor normal? | Yes | Inspect for poor APP sensor connector terminal A connection. Repair or replace if necessary, then go to Step 8. |
| | | No | Replace the APP sensor, then go to Step 8. |
| 5 | **INSPECT POWER SUPPLY CIRCUIT VOLTAGE AT APP SENSOR CONNECTOR**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage at APP sensor terminal A (harness-side).<br>• Is the voltage **within 4.5— 5.5 V?** | Yes | Go to the next step. |
| | | No | Repair or replace for an open circuit between APP sensor connector terminal A and PCM connector terminal 1AJ (harness-side).<br>Then, then go to Step 8. |
| 6 | **VERIFY APP2 SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Turn the ignition switch to off.<br>• Inspect for continuity between APP sensor terminal C (harness-side) and PCM terminal 1AC (harness-side).<br>• Inspect for continuity between APP sensor terminal A (harness-side) and PCM terminal 1AT (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected wiring harness, then go to Step 8. |
| 7 | **VERIFY APP2 SIGNAL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between APP sensor terminal C (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P2127 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

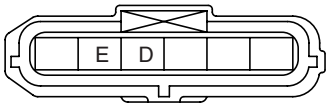
## DTC P2128[L3 WITH TC]

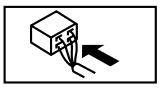
id010239812000

| DTC P2128 | Accelerator pedal position (APP) sensor No.2 circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the APP sensor No.2 signal. If the PCM detects that the APP sensor No.2 voltage is **above 4.5 V**, the PCM determines that the APP sensor No.2 circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • APP sensor malfunction<br>• Connector or terminal malfunction<br>• Open circuit between APP sensor terminal B and PCM terminal 1AV<br>• Short to power supply circuit between APP sensor terminal C and PCM terminal 1AC |



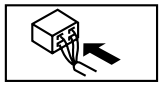

APP SENSOR
WIRING HARNESS SIDE CONNECTOR



PCM
WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT APP SENSOR CONNECTOR**<br>• Turn the ignition switch to off.<br>• Verify that the APP sensor connector is connected securely.<br>• Is the connector normal? | Yes | Go to the next step. |
| | | No | Connect the connector securely, then go to Step 10. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the APP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the suspected terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT APP SENSOR**<br>• Perform the APP sensor inspection. (See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is the APP sensor normal? | Yes | Go to the next step. |
| | | No | Replace the APP sensor, then go to Step 10. |
| 6 | **INSPECT APP2 SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn ignition switch to the ON position (Engine off).<br>• Measure the voltage between APP sensor terminal C (harness-side) and body ground.<br>• Is the voltage **above 4.5 V?** | Yes | Repair or replace for a short to power supply. Then, go to Step 10. |
| | | No | Go to the next step. |
| 7 | **VERIFY APP SENSOR GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the PCM connector.<br>• Inspect the continuity between APP sensor terminal B (harness-side) and PCM terminal 1AV (harness-side).<br>• Is there continuity? | Yes | Repair or replace for an open circuit between APP sensor terminal C (harness-side) and PCM connector terminal 1AC (harness-side). Then, go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 9 | **VERIFY APP SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY CIRCUIT**<br>• Inspect the continuity between throttle body terminals A and C (harness-side).<br>• Is there continuity? | Yes | Repair or replace the suspected wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P2128 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2135[L3 WITH TC]

id010239812100

| DTC P2135 | TP sensor No.1/No.2 voltage correlation problem |
|---|---|
| DETECTION CONDITION | • The PCM compares the input voltage from TP sensor No.1 with the input voltage from TP sensor No.2 when the engine is running. If the difference is more than the specification, the PCM determines that there is a TP sensor No.1/No.2 voltage correlation problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • TP sensor No.1 malfunction<br>• TP sensor No.2 malfunction<br>• Connector or terminal malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT THROTTLE BODY CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the throttle body connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |
| 4 | **INSPECT TP SENSOR**<br>• Inspect the TP sensor. (See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the throttle body, then go to Step 6. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P2135 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P2138[L3 WITH TC]

id010239812200

| DTC P2138 | APP sensor No.1/No.2 voltage correlation problem |
|---|---|
| DETECTION CONDITION | • The PCM compares the input voltage from APP sensor No.1 with the input voltage from APP sensor No.2 when the engine is running. If the difference is more than the specification, the PCM determines that there is an APP sensor No.1/No.2 angle correlation problem.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the PCM detects the above malfunction condition in the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • APP sensor No.1 malfunction<br>• APP sensor No.2 malfunction<br>• Connector or terminal malfunction<br>• PCM malfunction |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT APP SENSOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the APP sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |
| 4 | **INSPECT APP SENSOR**<br>• Inspect the APP sensor. (See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the APP sensor, then go to Step 6. (See01-13-17 ACCELERATOR PEDAL REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P2138 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

## DTC P2177[L3 WITH TC]

id010239812300

| DTC P2177 | Fuel system too lean at off idle |
|---|---|
| DETECTION CONDITION | • PCM monitors the short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) during closed loop fuel control at off-idle. If the LONGFT and the sum total of these fuel trims exceed the preprogrammed criteria, the PCM determines that the fuel system is too lean at off-idle.<br>**Diagnostic support note**<br>• This is a continuous monitor. (Fuel system)<br>• MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Misfire<br>• Front HO2S deterioration<br>• Front HO2S heater malfunction<br>• MAF sensor malfunction<br>• Pressure regulator malfunction<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Fuel pump malfunction<br>• Fuel filter clogged or restricted<br>• Fuel leakage on fuel line<br>• Exhaust system leakage<br>• Purge solenoid valve improper operation<br>• Purge solenoid valve malfunction (stuck open)<br>• Purge solenoid hoses improper connection<br>• Air suction in intake-air system<br>• Insufficient engine compression<br>• Variable valve timing control system improper operation<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Fuel system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch to off, then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | If misfire the DTC is present, go to Step 8.<br>If other DTCs is present, go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | If driveability concern is present, go to Step 8.<br>If not, go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2177 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION SWITCH TO THE ON POSITION/ IDLE)**<br>• Access the APP1, APP2, ECT, MAF, TP and VSS PIDs using the M-MDS.<br>• Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? | Yes | Inspect the sensor and excessive resistance in related wiring harnesses.<br>Repair if necessary.<br>Then go to Step 20. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION**<br>• Inspect the same PIDs as Step 5 while simulating FREEZE FRAME DATA condition.<br>• Is there any signal which causes drastic changes? | Yes | Inspect the sensor and related wiring harnesses repair or replace it.<br>Then go to Step 20. |
| | | No | Go to the next step. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS OF FRONT HO2S**<br>• Access the O2S11 for P2177 PID using the M-MDS.<br>• Check the PID under following accelerator pedal condition in NEUTRAL.<br>• Is the PID reading normal?<br>— **–0.1— 0.1 A when idle**<br>— **More than 0.25 mA just after release of accelerator pedal (lean condition).** | Yes | Go to the next step. |
| | | No | Visually inspect for any gas leakage between the exhaust manifold and the front HO2S.<br>Then go to Step 20. |
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 20. |
| 9 | **INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE AIR SYSTEM**<br>• Visually inspect for loosen, cracks or damages hoses on intake-air system.<br>• Is there any malfunction? | Yes | Repair or replace the source of air suction, then go to Step 20. |
| | | No | Go to the next step. |
| 10 | **INSPECT PURGE SOLENOID OPERATION**<br>• Perform the Purge Control System Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the purge control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection result, then go to Step 20. |
| 11 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 15. |
| | | No | Go to the next step. |
| 12 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 14. |
| 13 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor.<br>• Is fuel leakage found? (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 15. |
| | | No | Replace the fuel delivery pipe, then go to Step 20. |
| 14 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 20. |
| | | No | Go to the next step. |
| 15 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to Step 20. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 16 | **INSPECT IGNITION SYSTEM**<br>• Perform the spark test. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to spark test result, then go to Step 20. |
| 17 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression. (See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Implement the engine overhaul for repairs, then go to Step 20. |
| 18 | **INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION**<br>• Inspect the variable valve timing control system operation. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection results, then go to Step 20. |
| 19 | **INSPECT FUEL INJECTOR OPERATION**<br>• Remove the fuel injector.<br>• Inspect the fuel injector (resistance, injection amount). (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is the fuel injector normal? | Yes | Go to the next step. |
| | | No | Replace the fuel injector, then go to the next step. |
| 20 | **VERIFY TROUBLESHOOTING OF DTC P2177 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 21 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2178[L3 WITH TC]

id010239812400

| DTC P2178 | Fuel system too rich at off idle |
|---|---|
| DETECTION CONDITION | • PCM monitors the short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) during closed loop fuel control at off-idle. If the LONGFT and the sum total of these fuel trims exceed the preprogrammed criteria, the PCM determines that fuel system is too rich at off-idle.<br>**Diagnostic support note**<br>• This is a continuous monitor. (Fuel system)<br>• MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |

| DTC P2178 | Fuel system too rich at off idle |
|---|---|
| POSSIBLE CAUSE | • Misfire<br>• Front HO2S deterioration<br>• Front HO2S heater malfunction<br>• MAF sensor malfunction<br>• Pressure regulator malfunction<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Fuel pump malfunction<br>• EGR valve improper operation<br>• Variable swirl control improper operation<br>• Purge solenoid valve improper operation<br>• Purge solenoid valve malfunction (stuck open)<br>• Purge solenoid hoses improper connection<br>• PCV valve malfunction<br>• Variable valve timing control system improper operation<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Fuel system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch to off, then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | If misfire the DTC is present, go to Step 8.<br>If other DTCs is present, go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | If driveability concern is present, go to Step 8.<br>If not, go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2178 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION SWITCH TO THE ON POSITION/ IDLE)**<br>• Access the APP1, APP2, ECT, MAF, TP and VSS PIDs using the M-MDS.<br>• Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? | Yes | Inspect the sensor and excessive resistance in related wiring harnesses.<br>Repair if necessary.<br>Then go to Step 19. |
| | | No | Go to the next step. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION**<br>• Inspect the same PIDs as Step 5 while simulating FREEZE FRAME DATA condition.<br>• Is there any signal which causes drastic changes? | Yes | Inspect the sensor and related wiring harnesses, repair or replace it.<br>Then go to Step 19. |
| | | No | Go to the next step. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS OF FRONT HO2S**<br>• Access the O2S11 for P2177 PID using the M-MDS.<br>• Check the PID under following accelerator pedal condition in NEUTRAL.<br>• Is the PID reading normal?<br>— **–0.1— 0.1 A when idle**<br>— **More than 0.25 mA just after release of accelerator pedal (lean condition)** | Yes | Go to the next step. |
| | | No | Visually inspect for any gas leakage between the exhaust manifold and the front HO2S.<br>Then go to Step 19. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 19. |
| 9 | **INSPECT PURGE SOLENOID OPERATION**<br>• Perform the Purge Control System Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the purge control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection result, then go to Step 19. |
| 10 | **INSPECT PCV VALVE OPERATION**<br>• Inspect the PCV valve operation. (See01-16-14 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION[L3 WITH TC].)<br>• Is the PCV valve normal? | Yes | Go to the next step. |
| | | No | Replace the PCV valve, then go to Step 19 |
| 11 | **INSPECT EGR VALVE OPERATION**<br>• Perform the EGR Control System Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the EGR control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection result, then go to Step 19. |
| 12 | **INSPECT VARIABLE SWIRL CONTROL OPERATION**<br>• Perform the Variable Swirl Control Operation Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the variable swirl control work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection result, then go to Step 19. |
| 13 | **INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION**<br>• Inspect the variable valve timing control system operation. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection results, then go to Step 19. |
| 14 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 18. |
| | | No | Go to the next step. |
| 15 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 17. |
| 16 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the fuel delivery pipe, then go to Step 19. |
| 17 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 19. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 18 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to the next step. |
| 19 | **VERIFY TROUBLESHOOTING OF DTC P2178 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 20 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



### DTC P2187[L3 WITH TC]

id010239812500

| DTC P2187 | Fuel system too lean at idle |
|---|---|
| DETECTION CONDITION | • PCM monitors the short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) during closed loop fuel control at idle. If the LONGFT and the sum total of these fuel trims exceed the preprogrammed criteria, the PCM determines that fuel system is too lean at idle.<br>**Diagnostic support note**<br>• This is a continuous monitor. (Fuel system)<br>• MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Misfire<br>• Front HO2S deterioration<br>• Front HO2S heater malfunction<br>• MAF sensor malfunction<br>• Pressure regulator malfunction<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Fuel pump malfunction<br>• Fuel filter clogged or restricted<br>• Fuel leakage on fuel line from fuel delivery pipe and fuel pump<br>• Exhaust system leakage<br>• Purge solenoid valve malfunction<br>• Purge solenoid hoses improper connection<br>• Air suction in intake-air system<br>• Insufficient engine compression<br>• Variable valve timing control system improper operation<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Fuel system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch to off, then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | If misfire DTC is present, go to Step 8.<br>If other DTC is present, go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | If driveability concern is present, go to Step 8.<br>If not, go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2177 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION SWITCH TO THE ON POSITION/ IDLE)**<br>• Access the APP1, APP2, ECT, MAF and TP PIDs using the M-MDS.)<br>• Is there any signal that is far out of specification when the ignition switch is at the ON position and the engine runs? | Yes | Inspect the sensor and excessive resistance in related wiring harnesses.<br>Repair if necessary.<br>Then go to Step 20. |
| | | No | Go to the next step. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION**<br>• Inspect the same PIDs as Step 4 while simulating FREEZE FRAME DATA condition.<br>• Is there any signal which causes drastic changes? | Yes | Inspect the sensor and related wiring harnesses, repair or replace it.<br>Then go to Step 20. |
| | | No | Go to the next step. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS OF FRONT HO2S**<br>• Access the O2S11 for P2177 PID using the M-MDS.<br>• Check the PID under following accelerator pedal condition in NEUTRAL.<br>• Is the PID reading normal?<br>— **–0.1— 0.1 A when idle**<br>— **Below 0.25 mA just after release of accelerator pedal (lean condition)** | Yes | Go to the next step. |
| | | No | Visually inspect for any gas leakage between exhaust manifold and front HO2S.<br>Then go to Step 20. |
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 20. |
| 9 | **INSPECT FOR EXCESSIVE AIR SUCTION OF INTAKE AIR SYSTEM**<br>• Visually inspect for loosen, cracks or damages hoses on intake-air system.<br>• Is there any malfunction? | Yes | Repair or replace the source of air suction, then go to Step 20. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **INSPECT PURGE SOLENOID VALVE STUCK OPEN**<br>• Turn the ignition switch to off.<br>• Disconnect the both hoses from purge solenoid valve.<br>• Blow the air through purge solenoid valve.<br>• Does the air blow through? | Yes | Replace the purge solenoid valve.<br>Then go to Step 20. |
| | | No | Go to the next step. |
| 11 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 15. |
| | | No | Go to the next step. |
| 12 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 14. |
| 13 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 15. |
| | | No | Replace the fuel delivery pipe, then go to Step 20. |
| 14 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 20. |
| | | No | Go to the next step. |
| 15 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to Step 20. |
| 16 | **INSPECT IGNITION SYSTEM**<br>• Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to spark test results, then go to Step 20. |
| 17 | **INSPECT ENGINE COMPRESSION**<br>• Inspect the engine compression.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Implement the engine overhaul for repairs, then go to Step 20. |
| 18 | **INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION**<br>• Inspect the variable valve timing control system operation.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection results, then go to Step 20. |
| 19 | **INSPECT FUEL INJECTOR OPERATION**<br>• Remove the fuel injector.<br>• Inspect the fuel injector (resistance, injection amount).<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is the fuel injector normal? | Yes | Go to the next step. |
| | | No | Replace the fuel injector, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 20 | **VERIFY TROUBLESHOOTING OF DTC P2187 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 21 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2188[L3 WITH TC]

id010239812600

| DTC P2188 | Fuel system too rich at idle |
|---|---|
| DETECTION CONDITION | • PCM monitors the short term fuel trim (SHRTFT) and long term fuel trim (LONGFT) during closed loop fuel control at idle. If the LONGFT and the sum total of these fuel trims exceed the preprogrammed criteria, the PCM determines that fuel system is too rich at idle.<br>**Diagnostic support note**<br>• This is a continuous monitor. (Fuel system)<br>• MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Misfire<br>• Front HO2S deterioration<br>• Front HO2S heater malfunction<br>• MAF sensor malfunction<br>• Pressure regulator malfunction<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Fuel pump malfunction<br>• EGR valve stuck open<br>• Variable swirl control improper operation<br>• Purge solenoid valve improper operation<br>• Purge solenoid valve malfunction (stuck open)<br>• Purge solenoid hoses improper connection<br>• PCV valve malfunction<br>• Variable valve timing control system improper operation<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (Fuel system related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch to off, then to the ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | If misfire the DTC is present, go to Step 8.<br>If other DTCs is present, go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | If driveability concern is present, go to Step 8.<br>If not, go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2178 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting procedures for DTC on FREEZE FRAME DATA. |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS (IGNITION SWITCH TO THE ON POSITION/ IDLE)**<br>• Access the APP1, APP2, ECT, MAF, TP and VSS PIDs using the M-MDS.<br>• Is there any signal that is far out of specification when the ignition switch is at the ON position and engine runs? | Yes | Inspect the sensor and excessive resistance in related wiring harnesses.<br>Repair or if necessary.<br>Then go to Step 19. |
| | | No | Go to the next step. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER TROUBLE CONDITION**<br>• Inspect the same PIDs as Step 5 while simulating FREEZE FRAME DATA condition.<br>• Is there any signal which causes drastic changes? | Yes | Inspect the sensor and related wiring harnesses, repair or replace it.<br>Then go to Step 19. |
| | | No | Go to the next step. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS OF FRONT HO2S**<br>• Access the O2S11 for P2177 PID using the M-MDS.<br>• Check the PID under following accelerator pedal condition in NEUTRAL.<br>• Is the PID reading normal?<br>— **–0.1— 0.1 A when idle**<br>— **Below 0.25 mA just after release of accelerator pedal (lean condition)** | Yes | Go to the next step. |
| | | No | Visually inspect for any gas leakage between the exhaust manifold and the front HO2S.<br>Then go to Step 19. |
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 19. |
| 9 | **INSPECT PURGE SOLENOID OPERATION**<br>• Perform the Purge Control System Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the purge control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection result, then go to Step 19. |
| 10 | **INSPECT PCV VALVE OPERATION**<br>• Inspect the PCV valve operation. (See01-16-14 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION[L3 WITH TC].)<br>• Is the PCV valve normal? | Yes | Go to the next step. |
| | | No | Replace the PCV valve, then go to Step 19. |
| 11 | **INSPECT VARIABLE SWIRL CONTROL OPERATION**<br>• Perform the Variable Swirl Control Operation Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the variable swirl control work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection result, then go to Step 19. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 12 | **INSPECT VARIABLE VALVE TIMING CONTROL SYSTEM OPERATION**<br>• Inspect the variable valve timing control system operation. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part according to inspection results, then go to Step 18. |
| 13 | **INSPECT IF EGR VALVE IS STUCK OPEN**<br>• Remove the EGR valve.<br>• Does the EGR valve stuck open? | Yes | Clean or replace the EGR valve, then go to Step 19. |
| | | No | Go to the next step. |
| 14 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 18. |
| | | No | Go to the next step. |
| 15 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 17. |
| 16 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 19. |
| | | No | Replace the fuel delivery pipe, then go to Step 19. |
| 17 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 19. |
| | | No | Go to the next step. |
| 18 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to the next step. |
| 19 | **VERIFY TROUBLESHOOTING OF DTC P2188 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adaptive Memory Produce Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 20 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2195[L3 WITH TC]

id010239812700

| DTC P2195 | Front HO2S signal stuck lean |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S output current when the following conditions are met. If the average output current is **more than 1.2 A for25 s**, the PCM determines that the front HO2S has a malfunction.<br>**MONITORING CONDITION**<br>— ECT: more than **70 — 150 °C {158— 302 °F}**<br>— Engine speed: **1,000— 3,200 rpm**<br>— Charging efficiency: **20— 62.5%**<br>— Output voltage from the rear HO2S: **0.2 V or above**<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• The DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Fuel injector malfunction<br>• Insufficient fuel line pressure<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Exhaust gas leakage<br>• Air suction at intake-air system malfunction<br>• Fuel leakage<br>• MAF sensor malfunction<br>• ECT sensor malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch to off, then to ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs.<br>• Is the DTC P2177 or P2187 also present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2195 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to FREEZE FRAME DATA DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs.<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— APP1<br>— APP2<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 16. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA CONDITION**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs under FREEZE FRAME DATA condition.<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— APP1<br>— APP2<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 16. |
| 7 | **INSPECT INTAKE-AIR SYSTEM FOR EXCESSIVE AIR SUCTION**<br>• Visually inspect for loosen, cracks or damages hose in intake-air system.<br>• Is there any malfunction**?** | Yes | Repair or replace the malfunctioning part, then go to Step 16. |
| | | No | Go to the next step. |
| 8 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 16. |
| 9 | **INSPECT FRONT HO2S**<br>• Inspect the front HO2S.<br>(See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the front HO2S, then go to Step 16.<br>(See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **INSPECT FUEL INJECTOR**<br>• Inspect the fuel injector.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the suspected fuel injector, then go to Step 16.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FUEL_PRES PID.<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 15. |
| | | No | Go to the next step. |
| 12 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 14. |
| 13 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 15. |
| | | No | Replace the fuel delivery pipe, then go to Step 16. |
| 14 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 16. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 15 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump. (See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to the next step. |
| 16 | **VERIFY TROUBLESHOOTING OF DTC P2195 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adopted Memory Produce Drive Mode and HO2S heater, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 17 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



### DTC P2196[L3 WITH TC]

id010239812800

| DTC P2196 | Front HO2S signal stuck rich |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S output current when the following conditions are met. If the average output current is **less than 0.85 A for 25 s**, the PCM determines that the front HO2S has a malfunction.<br>**MONITORING CONDITION**<br>— ECT: **more than 70— 150 °C {158— 302 °F}**<br>— Engine speed: **1,000— 3,200 rpm**<br>— Charging efficiency: **20— 62.5%**<br>— Output voltage from the rear HO2S: **0.8 V or less**<br>**Diagnostic support note**<br>• This is an intermittent monitor (HO2S).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Fuel injector malfunction<br>• Excessive fuel pressure<br>• Fuel pressure sensor malfunction<br>• Relief valve (built-in fuel delivery pipe) malfunction<br>• Spill valve control solenoid valve (built-in high pressure fuel pump) malfunction<br>• High pressure fuel pump malfunction<br>• Restriction in intake-air system<br>• MAF sensor malfunction<br>• ECT sensor malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch to off, then ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs.<br>• Is the DTC P2177 or P2187 also present? | Yes | Go to the appropriate DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2196 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to FREEZE FRAME DATA DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **VERIFY CURRENT INPUT SIGNAL STATUS**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs. (See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>— APP1<br>— APP2<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 15. |
| 6 | **VERIFY CURRENT INPUT SIGNAL STATUS UNDER FREEZE FRAME DATA CONDITION**<br>• Connect the M-MDS to the DLC-2.<br>• Verify the following PIDs under the FREEZE FRAME DATA condition.<br>— APP1<br>— APP2<br>— ECT<br>— MAF<br>— TP<br>— VSS<br>• Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Inspect the malfunctioning part according to the inspection results.<br>Then go to Step 15. |
| 7 | **VERIFY CURRENT INPUT SIGNAL STATUS OF MAF SENSOR**<br>• Connect the M-MDS to the DLC-2.<br>• Start the engine.<br>• Access the MAF PID.<br>• Verify that the MAF PID changes quickly according to engine speed.<br>• Is the PID normal? | Yes | Go to the next step. |
| | | No | Replace the MAF/IAT sensor, then go to Step 15. |
| 8 | **INSPECT FRONT HO2S**<br>• Inspect the front HO2S. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].)<br>• Is there any malfunction**?** | Yes | Replace the front HO2S, then go to Step 15. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **INSPECT FUEL INJECTOR**<br>• Inspect the fuel injector. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>• Is there any malfunction? | Yes | Replace the suspected fuel injector, then go to Step 15. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **INSPECT FUEL PRESSURE (HIGH-SIDE)**<br>• Access and monitor FRP PID.<br>• Is the FRP PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 14. |
| | | No | Go to the next step. |
| 11 | **IDENTIFY CAUSE BY FUEL PRESSURE SENSOR OR HIGH PRESSURE FUEL PUMP**<br>• Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 16. |
| 12 | **INSPECT FUEL PRESSURE SENSOR**<br>• Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>• Is the fuel pressure sensor normal? | Yes | Go to Step 14. |
| | | No | Replace the fuel delivery pipe, then go to Step 15. |
| 13 | **INSPECT HIGH PRESSURE FUEL PUMP**<br>• Replace the high pressure fuel pump<br>• Monitor FUEL_PRES PID<br>• Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 15. |
| | | No | Go to the next step. |
| 14 | **INSPECT FUEL PRESSURE (LOW-SIDE)**<br>• Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>• Measure the low side fuel pressure. (See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>• Is the low side fuel pressure within the specified? | Yes | Go to the next step. |
| | | No | Inspect for following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If okay replace the fuel pump. Then go to the next step. |
| 15 | **VERIFY TROUBLESHOOTING OF DTC P2196 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the PCM Adopted Memory Produce Drive Mode and HO2S heater, and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 16 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2228[L3 WITH TC]

id010239812900

| DTC P2228 | BARO sensor circuit low input |
|---|---|
| DETECTION CONDITION | • PCM monitors the input voltage from the BARO sensor. If the input voltage at the PCM is **below 1.95 V**, the PCM determines that the BARO sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • BARO sensor malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT BARO SENSOR MALFUNCTION**<br>• Start the engine.<br>• Access the BARO PID using the M-MDS.<br>• Inspect that the BARO PID is within the specification.<br>• Is there any malfunction? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 4 | **VERIFY TROUBLESHOOTING OF DTC P2228 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | No concern is detected. Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

**DTC P2229[L3 WITH TC]**

id0102398130000

| DTC P2229 | BARO sensor circuit high input |
|---|---|
| DETECTION CONDITION | • PCM monitors the input voltage from the BARO sensor. If the input voltage at the PCM is **above 4.45 V**, the PCM determines that the BARO sensor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • BARO sensor malfunction<br>• PCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT BARO SENSOR MALFUNCTION**<br>• Start the engine.<br>• Access the BARO PID using the M-MDS.<br>• Inspect that the BARO PID is within the specification.<br>• Is there any malfunction? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |

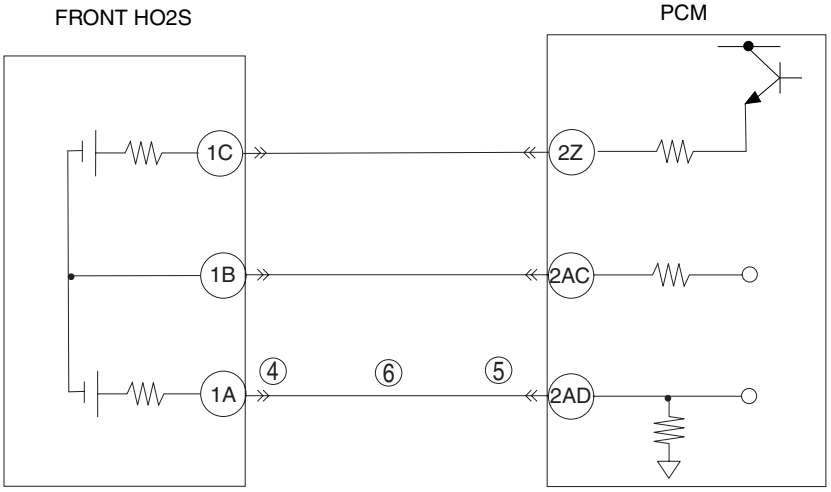
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **VERIFY TROUBLESHOOTING OF DTC P2229 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the memory using the M-MDS.<br>• Start engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | No concern is detected. Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |



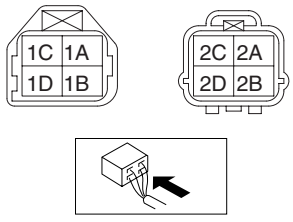
### DTC P2237[L3 WITH TC]

id010239813100

| DTC P2237 | Front HO2S positive current control circuit open |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S positive current control circuit voltage. If the voltage does not change with the PCM control value while the engine is running, the PCM determines that the front HO2S positive current control circuit is open.<br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Connector or terminal malfunction<br>• Open circuit between PCM terminal 2AD and front HO2S terminal 1A<br>• PCM malfunction |




FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

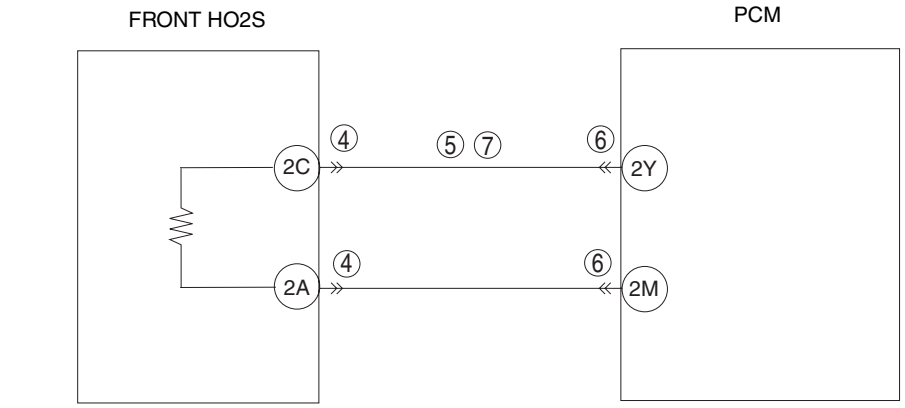
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information. If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2237 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting for DTC on FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 4 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step. |
| | | No | Go to the next step. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step. |
| | | No | Go to the next step. |
| 6 | **INSPECT FRONT HO2S POSITIVE CURRENT CIRCUIT FOR OPEN AT PCM - FRONT HO2S**<br>• Front HO2S and PCM connectors disconnected.<br>• Verify the continuity between PCM terminal 2AD and front HO2S terminal 1A.<br>• Is there continuity? | Yes | Replace the front HO2S, then go to the next step. |
| | | No | Repair or replace the wiring harness for an open, then go to the next step. |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2237 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

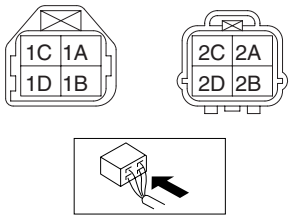
## DTC P2245[L3 WITH TC]

id010239813200

| DTC P2245 | Front HO2S sensor reference voltage circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors is front HO2S sensor reference voltage circuit voltage. If the voltage below the threshold value while the engine is running, the PCM determines that the front HO2S sensor reference voltage circuit is low.<br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Connector or terminal malfunction<br>• Short to ground circuit between PCM terminal 2Y and front HO2S sensor terminal 2C<br>• PCM malfunction |

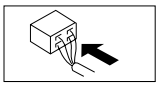



FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

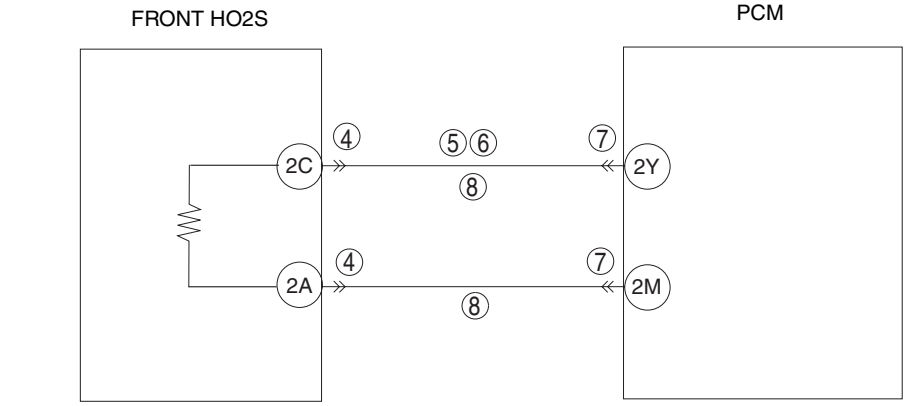
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2245 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting for DTC on FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT FRONT HO2S REFERENCE VOLTAGE CIRCUIT FOR SHORT TO GROUND AT FRONT HO2S**<br>• Turn the ignition switch to the off.<br>• Front HO2S connector disconnected.<br>• Inspect the continuity between front HO2S terminal 2C (part-side) and ground.<br>• Is there continuity? | Yes | Replace the front HO2S, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT FRONT HO2S REFERENCE VOLTAGE CIRCUIT FOR SHORT TO GROUND AT PCM - FRONT HO2S**<br>• Turn the ignition switch to the off.<br>• Front HO2S and PCM connectors disconnected.<br>• Inspect the continuity between front HO2S terminal 2C (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to ground between PCM terminal 2Y and front HO2S sensor terminal 2C, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P2245 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

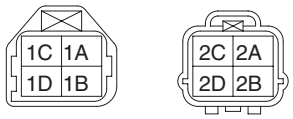
## DTC P2246[L3 WITH TC]

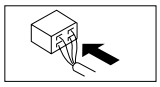
id010239813300

| DTC P2246 | Front HO2S sensor reference voltage circuit high input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S sensor reference voltage circuit voltage. If the voltage is above the threshold value while the engine is running, the PCM determines that the front HO2S sensor reference voltage circuit is high.<br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Connector or terminal malfunction<br>• Short to the power circuit between PCM terminal 2Y and front HO2S terminal 2C<br>• Open circuit between PCM terminal 2Y and front HO2S terminal 2C<br>• Open circuit between PCM terminal 2M and front HO2S terminal 2A<br>• PCM malfunction |



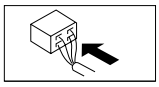

FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

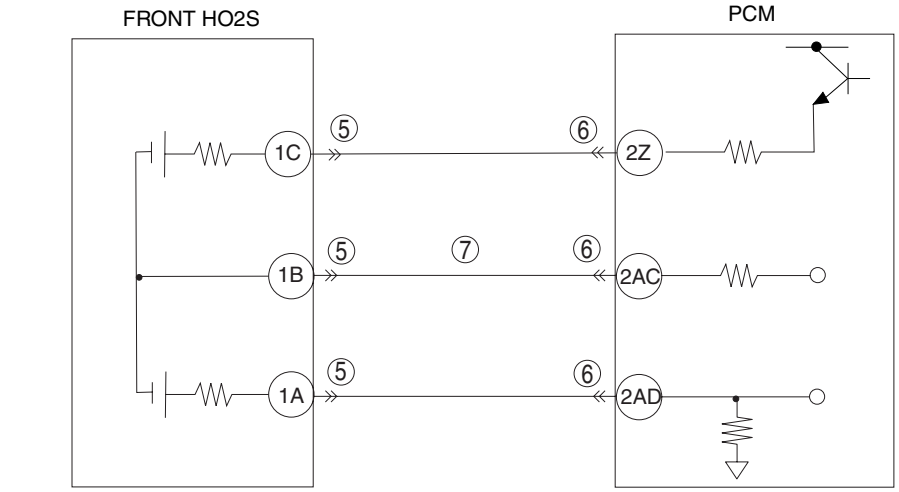
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2246 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting for DTC on FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 5 | **INSPECT FRONT HO2S REFERENCE VOLTAGE CIRCUIT FOR SHORT TO POWER AT FRONT HO2S**<br>• Front HO2S connector disconnected.<br>• Turn the ignition switch to the ON position (engine off).<br>• Measure the voltage between front HO2S terminal 2C (part-side) and ground.<br>• Is the voltage **above 5.0 V**? | Yes | Replace the front HO2S, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT FRONT HO2S REFERENCE VOLTAGE CIRCUIT FOR SHORT TO POWER AT PCM - FRONT HO2S**<br>• Front HO2S connector disconnected.<br>• Turn the ignition switch to the ON position (engine off).<br>• Measure the voltage between front HO2S terminal 2C (harness-side) and ground.<br>• Is the voltage **above 5.0 V**? | Yes | Repair or replace for a short to power, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **INSPECT FRONT HO2S REFERENCE VOLTAGE CIRCUIT FOR OPEN AT PCM - FRONT HO2S**<br>• Front HO2S and PCM connectors disconnected.<br>• Verify the continuity between following terminals at harness-side connectors.<br>— PCM terminal 2Y— front HO2S terminal 2C<br>— PCM terminal 2M— front HO2S terminal 2A<br>• Is there continuity? | Yes | Replace the front HO2S, then go to the next step. |
| | | No | Repair or replace for an open circuit, then go to the next step. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P2246 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

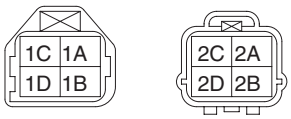
## DTC P2251[L3 WITH TC]

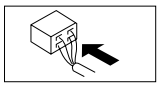
id010239813400

| DTC P2251 | Front HO2S negative current control circuit open |
|---|---|
| DETECTION CONDITION | • The PCM monitors the front HO2S negative current control circuit voltage. If the voltage does not change with the PCM control value while the engine is running, the PCM determines that the front HO2S negative current control circuit is open.<br>**Diagnostic support note**<br>• This is a continuous monitor (HO2S).<br>• The MIL illuminates if the PCM detects the above malfunctioning condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction conditions during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Front HO2S malfunction<br>• Connector or terminal malfunction<br>• Open circuit between PCM terminal 2AC and front HO2S terminal 1B<br>• Front HO2S heater cannot be controlled<br>• PCM malfunction |



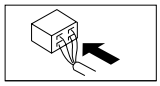

FRONT HO2S
WIRING HARNESS-SIDE CONNECTOR



PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



### Diagnostic procedure

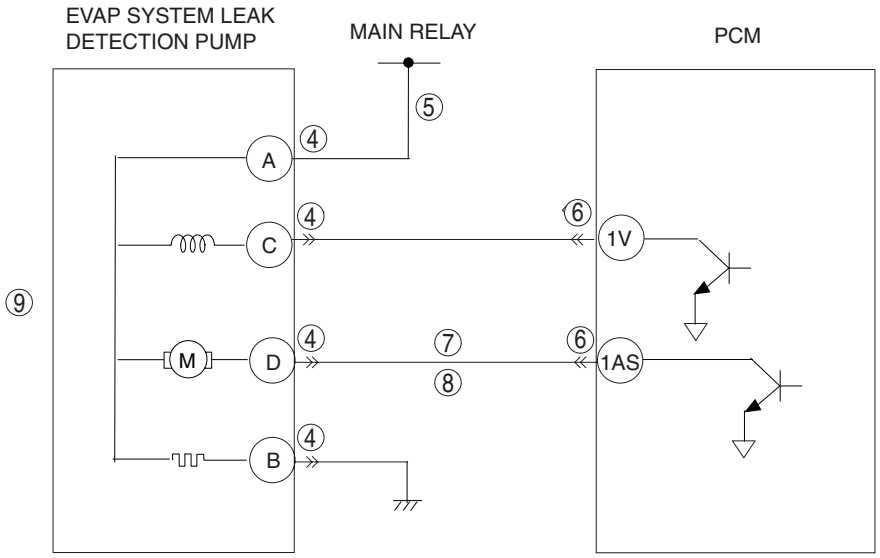
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA AND DIAGNOSTIC MONITORING TEST RESULTS HAVE BEEN RECORDED**<br>• Have the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS (HO2S related) been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA and DIAGNOSTIC MONITORING TEST RESULTS on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch to off, then ON position (Engine off).<br>• Verify the related PENDING CODE or stored DTCs using the M-MDS.<br>• Is the DTC P0030, P0031 or P0032 also present? | Yes | Go to appropriate DTC troubleshooting procedure. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **IDENTIFY TRIGGER DTC FOR FREEZE FRAME DATA**<br>• Is DTC P2251 on FREEZE FRAME DATA? | Yes | Go to the next step. |
| | | No | Go to troubleshooting for DTC on FREEZE FRAME DATA. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| 5 | **INSPECT FRONT HO2S CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the front HO2S connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch to off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT FRONT HO2S NEGATIVE CURRENT CONTROL CIRCUIT FOR OPEN AT PCM - FRONT HO2S**<br>• The front HO2S and the PCM connectors disconnected.<br>• Verify the continuity between the PCM terminal 2AC and the front HO2S terminal 1B at harness-side connectors.<br>• Is there continuity? | Yes | Replace the front HO2S, then go to the next step. |
| | | No | Repair or replace for open circuit, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P2251 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the HO2S heater, HO2S and TWC Repair Verification Drive Mode. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>• Is the PENDING CODE same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the AFTER REPAIR PROCEDURE. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

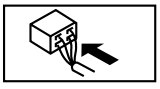
## DTC P2401[L3 WITH TC]

id010239813500

| DTC P2401 | EVAP system leak detection pump motor circuit low |
|---|---|
| DETECTION CONDITION | • The PCM monitors the pump load current (EVAP line pressure), while the EVAP leak monitor is operating. If the pump load current is lower than specified, the PCM determines that the EVAP system leak detection pump motor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a intermittent monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • EVAP system leak detection pump malfunction<br>• Open circuit between main relay and EVAP system leak detection pump terminal A<br>• Open circuit between EVAP system leak detection pump terminal D and PCM terminal 1AS<br>• Short to ground circuit between EVAP system leak detection pump terminal D and PCM terminal 1AS<br>• Poor connection at the EVAP system leak detection pump or the PCM connector<br>• PCM malfunction |

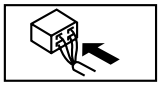



EVAP SYSTEM DETECTION PUMP WIRING HARNESS SIDE CONNECTOR



PCM WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



**Diagnostic procedure**

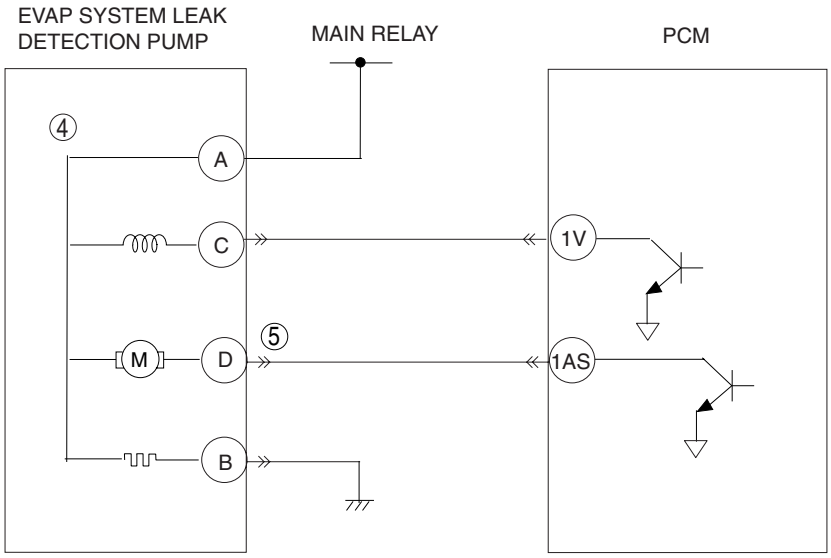
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTC**<br>• Turn the ignition switch to the OFF then ON position (Engine off).<br>• Verify related PENDING CODE or stored DTC.<br>• Is DTC P2405 present? | Yes | Go to appropriate DTC inspection.<br>(See01-02-249 DTC P2405[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect EVAP system leak detection pump connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP MOTOR CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the main relay.<br>• Inspect continuity between EVAP system leak detection pump terminal A (harness-side) and main relay.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 6 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminal, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP MOTOR CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between EVAP system leak detection pump terminal D (harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP MOTOR CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect continuity between EVAP system leak detection pump terminal D (harness-side) and PCM terminal 1AS (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 9 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP**<br>• Perform the EVAP system leak detection pump inspection.<br>(See01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION[L3 WITH TC].)<br>• Is the EVAP system leak detection pump normal? | Yes | Go to the next step. |
| | | No | Replace the EVAP system leak detection pump, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **VERIFY TROUBLESHOOTING OF DTC P2401 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the EVAP system test using the M-MDS.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the same DTC present?<br><br>**Note**<br>• If EVAP system test function is not available, take following procedure.<br>— Start the engine and perform the "EVAP System Repair Verification Drive Mode".<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>— Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the "After Repair Procedure".<br>(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2402[L3 WITH TC]

id010239813600

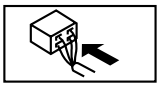
| DTC P2402 | EVAP system leak detection pump motor circuit high |
|---|---|
| DETECTION CONDITION | • The PCM monitors the pump load current (EVAP line pressure), while the EVAP leak monitor is operating. If the pump load current is higher than specified, the PCM determines that the EVAP system leak detection pump motor circuit has a malfunction.<br>**Diagnostic support note**<br>• This is a intermittent monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • EVAP system leak detection pump malfunction<br>• Short to the power supply between the EVAP system leak detection pump terminal D and PCM terminal 1AS<br>• PCM malfunction |

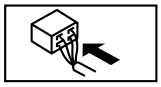



EVAP SYSTEM DETECTION PUMP WIRING HARNESS SIDE CONNECTOR

PCM WIRING HARNESS SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |





### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnostic according to the available repair information.<br>• If the vehicle is not repaired, then go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY RELATED PENDING CODE OR STORED DTCS**<br>• Turn the ignition switch to the OFF then ON position (Engine off).<br>• Verify related pending code or stored DTCs.<br>• Are other DTCs present? | Yes | Go to the next step. |
| | | No | Replace the EVAP system leak detection pump, then go to step 6. (See 01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/ INSTALLATION[L3 WITH TC]) |
| 4 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP**<br>• Inspect the EVAP system leak detection pump. (See 01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION[L3 WITH TC])<br>• Is the EVAP system leak detection pump normal? | Yes | Go to the appropriate DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | **CHECK EVAP SYSTEM LEAK DETECTION PUMP CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Turn the ignition switch to the ON position.<br>• Disconnect the EVAP system leak detection pump connector.<br>• Measure the voltage between EVAP system leak detection pump terminal D (harness-side) and body ground.<br>• Is the voltage **B+?** | Yes | Repair or replace the wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P2402 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the EVAP system test using the M-MDS. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the same DTC present?<br>**Note**<br>• If EVAP system test function is not available, take following procedure.<br>— Start the engine and perform the “EVAP System Repair Verification Drive Mode”. (See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>— Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2404[L3 WITH TC]

id010239813700

| DTC P2404 | EVAP system leak detection pump sensor circuit malfunction |
|---|---|
| DETECTION CONDITION | • The PCM monitors the pump load current (EVAP line pressure), while the EVAP leak monitor is operating. After obtaining the reference current value, If the pump load current is greater than or equal to the reference current value plus **2 mA** within the specified time, the PCM determines that the air filter has a malfunction.<br>**Diagnostic support note**<br>• This is a intermittent monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • Air filter clogging<br>• EVAP hose bending<br>• PCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnostic according to the available repair information.<br>• If the vehicle is not repaired, then go to the next step. |
| | | No | Go to the next step. |
| 3 | **CHECK EVAP HOSE BENDING**<br>• Inspect the EVAP hose for bending.<br>• Is the EVAP hose normal? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected hose, then go to Step 5. |
| 4 | **CHECK AIR FILTER FOR CLOGGING**<br>• Inspect the air filter for clogging.<br>• Is the air filter normal? | Yes | Go to the next step. |
| | | No | Replace the air filter, then go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P2404 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the EVAP system test using the M-MDS.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the same DTC present?<br>**Note**<br>• If EVAP system test function is not available, take following procedure.<br>— Perform the “EVAP System Repair Verification Drive Mode”.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>— Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2405[L3 WITH TC]

id010239813800

| DTC P2405 | EVAP system leak detection pump sensor circuit low input |
|---|---|
| DETECTION CONDITION | • The PCM monitors the pump load current (EVAP line pressure), while the EVAP leak monitor is operating. If the current is lower than the specification while the PCM obtains the reference current value, the PCM determines that the EVAP system leak detection pump orifice has a malfunction.<br>**Diagnostic support note**<br>• This is a intermittent monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • EVAP system leak detection pump orifice has fallen off<br>• EVAP system leak detection pump motor malfunction<br>• PCM malfunction |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the EVAP system leak detection pump, then go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P2405 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the EVAP system test using the M-MDS.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the same DTC present?<br>**Note**<br>• If EVAP system test function is not available, take following procedure.<br>— Start the engine and perform the "EVAP System Repair Verification Drive Mode".<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>— Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the "After Repair Procedure".<br>(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

## DTC P2407[L3 WITH TC]

id010239813900

| DTC P2407 | EVAP system leak detection pump sensor circuit intermittent |
|---|---|
| DETECTION CONDITION | • The PCM monitors pump the load current (EVAP line pressure), while the EVAP leak monitor is operating. When either of the following is detected**6 times or more successively, the PCM determines that the EVAP system leak detection pump heater has a malfunction:**<br>— While obtaining the reference current value, the change in pump load current exceeds the specification.<br>— After obtaining the reference current value, the pump load current is kept lower than the maximum pump load current for more than the specified time.<br>**Diagnostic support note**<br>• This is a intermittent monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in PCM memory. |
| POSSIBLE CAUSE | • EVAP system leak detection pump heater malfunction<br>• PCM malfunction |

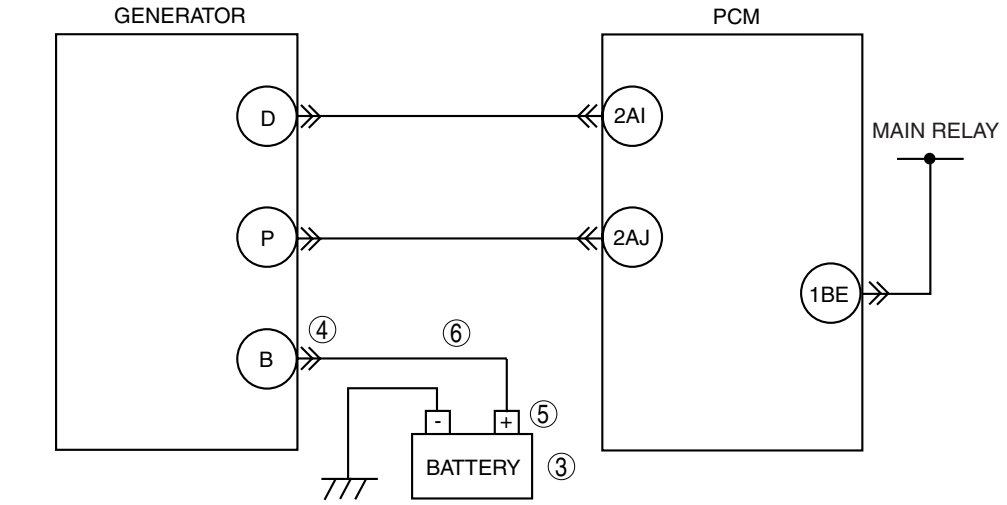
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT EVAP SYSTEM LEAK DETECTION PUMP HEATER**<br>• Perform the EVAP system leak detection pump inspection.<br>(See01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION[L3 WITH TC])<br>• Is the EVAP system leak detection pump normal? | Yes | Replace the EVAP system leak detection pump, then go to the next step. |
| | | No | Go to the next step. |
| 4 | **VERIFY TROUBLESHOOTING OF DTC P2407 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the EVAP system test using the M-MDS.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>• Is the same DTC present?<br>**Note**<br>• If EVAP system test function is not available, take following procedure.<br>— Start the engine and perform the “EVAP System Repair Verification Drive Mode”.<br>(See01-02-10 OBD-II DRIVE MODE[L3 WITH TC].)<br>— Is the PENDING CODE for this DTC present? | Yes | Replace the PCM, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

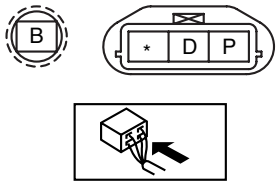
## DTC P2502[L3 WITH TC]

id010239814000

| DTC P2502 | Charging system voltage problem |
|---|---|
| DETECTION CONDITION | • PCM determines that the generator output voltage is **above 17 V** or the battery voltage is **below 11 V** while the engine is running.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Open circuit between generator terminal B and battery positive terminal<br>• Battery malfunction<br>• Generator malfunction<br>• PCM is poorly connected<br>• PCM, generator and/or battery are poorly connected |




GENERATOR
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

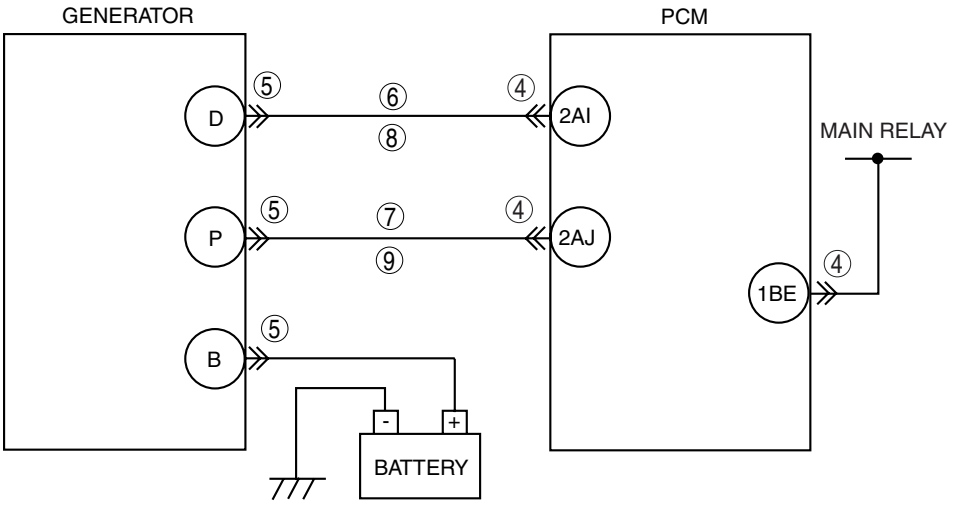
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT BATTERY**<br>• Turn the ignition switch off.<br>• Inspect the battery.<br>• Is the battery normal? | Yes | Go to the next step. |
| | | No | Replace the battery, then go to Step 8. |
| 4 | **INSPECT GENERATOR**<br>• Inspect the generator. (See 01-17-6 GENERATOR INSPECTION[L3 WITH TC])<br>• Is the generator normal? | Yes | Go to the next step. |
| | | No | Replace the generator, then go to Step 8. (See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC]) |
| 5 | **INSPECT POOR INSTALLATION OF GENERATOR TERMINAL**<br>• Turn the ignition switch to off.<br>• Inspect for looseness of generator terminal B installation nut.<br>• Is the nut loose? | Yes | Tighten the generator terminal B installation nut, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT POOR INSTALLATION OF BATTERY POSITIVE TERMINAL**<br>• Inspect for looseness of battery positive terminal.<br>• Is the terminal loose? | Yes | Connect the battery positive terminal correctly, then go to Step 8. |
| | | No | Go to the next step. |
| 7 | **INSPECT BATTERY CHARGING CIRCUIT**<br>• Disconnect the generator terminal B.<br>• Measure the voltage between generator terminal B (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness between generator terminal B and battery positive terminal, then go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P2502 COMPLETED**<br>• Make sure to reconnect all connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2503[L3 WITH TC]

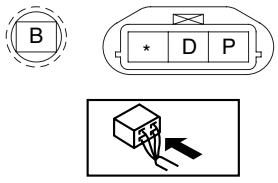
id010239814100

| DTC P2503 | Charging system voltage low |
|---|---|
| **DETECTION CONDITION** | • PCM needs **more than 20 A** from the generator, and determines that generator output voltage is **below 8.5 V** while the engine is running.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Generator malfunction<br>• PCM and/or generator are poorly connected<br>• Open and/or short to ground in the wiring harness from between generator terminal P and PCM terminal 2AJ<br>• Open and/or short to ground in the wiring harness from between generator terminal D and PCM terminal 2AI<br>• Drive chain misadjustment |

| DTC P2503 | Charging system voltage low |
|---|---|




GENERATOR
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT DRIVE CHAIN CONDITION**<br>• Verify that the drive chain auto tensioner indicator mark does not exceed limit.<br>• Is the front drive chain normal? | Yes | Go to the next step. |
| | | No | Replace the and/or adjust drive chain, then go to Step 10. |
| 4 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged, pulled-out terminals, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair the terminals, then go to Step 10. |
| | | No | Go to the next step. |
| 5 | **INSPECT GENERATOR CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the generator connector.<br>• Inspect for poor connection (damaged, pulled-out terminals, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminals, then go to Step 10. |
| | | No | Go to the next step. |

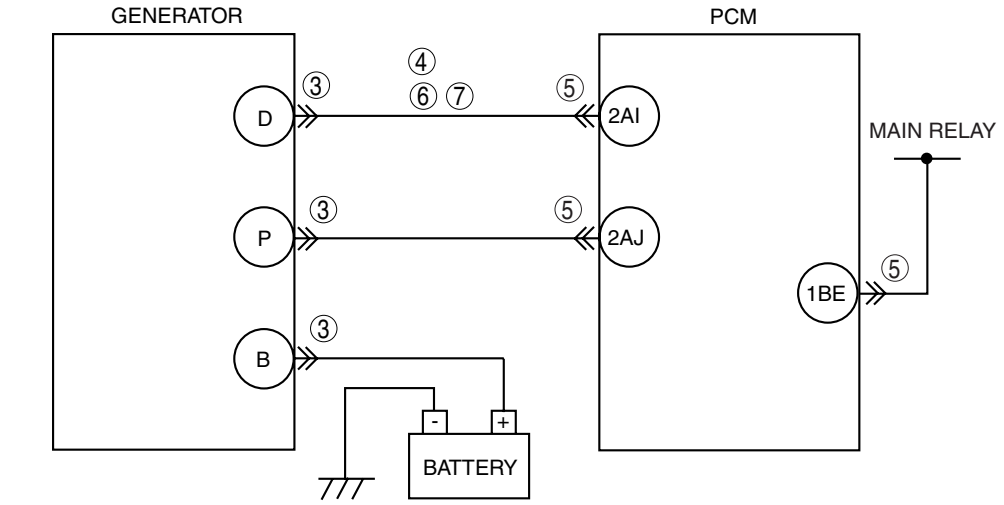
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between generator terminal D (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT GENERATOR OUTPUT VOLTAGE MONITOR CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between generator terminal P (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground, then go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT GENERATOR CONTROL CIRCUIT FOR OPEN**<br>• Inspect for continuity between generator terminal D (wiring harness-side) and PCM terminal 2AI (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to Step 10. |
| 9 | **INSPECT GENERATOR OUTPUT VOLTAGE MONITOR CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between generator terminal P (wiring harness-side) and PCM terminal 2AJ (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the generator, then go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P2503 COMPLETED**<br>• Make sure to reconnect all connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2504[L3 WITH TC]

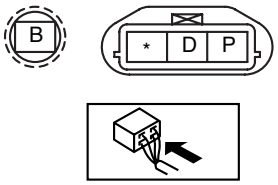
id010239814200

| DTC P2504 | Charging system voltage high |
|---|---|
| DETECTION CONDITION | • PCM determines that the generator output voltage is **above 18.5 V** or the battery voltage is **above 16.0 V** while the engine is running.<br>**Diagnostic support note**<br>• This is a continuous monitor (Other).<br>• The MIL does not illuminate.<br>• FREEZE FRAME DATA is not available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • Short to the power circuit between generator connector terminal D and PCM connector terminal 2AI<br>• Generator malfunction<br>• PCM and/or generator are poorly connected |

| DTC P2504 | Charging system voltage high |
|---|---|



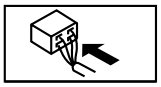

GENERATOR
WIRING HARNESS-SIDE CONNECTOR




PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT GENERATOR CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the generator connector.<br>• Inspect for poor connection (damaged/pulled-out terminals, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the terminals, then go to Step 8. |
| | | No | Go to the next step. |
| 4 | **CLASSIFY GENERATOR MALFUNCTION OR OTHER MALFUNCTION**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between generator terminal D (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | There is a malfunction at the generator.<br>Go to Step 7. |

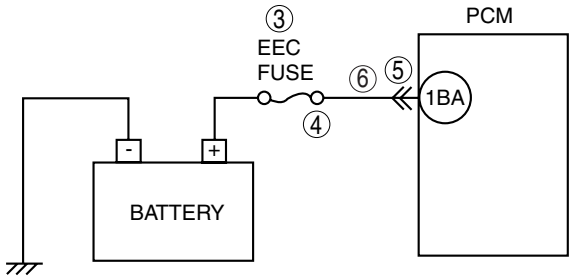
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Turn the ignition switch off.<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (damaged/pulled-out terminals, corrosion, etc.).<br>• Is there any malfunction? | Yes | Repair or replace the pins, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT GENERATOR CONTROL CIRCUIT FOR SHORT TO POWER**<br>• Turn the ignition switch to the ON position (engine off).<br>• Measure the voltage between generator terminal D (wiring harness-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the wiring harness for a short to power supply, then go to Step 8. |
| | | No | Go to Step 8. |
| 7 | **INSPECT GENERATOR CONTROL TERMINAL FOR SHORT TO POWER**<br>• Measure the voltage between generator terminal D (part-side) and body ground.<br>• Is the voltage **B+**? | Yes | Repair or replace the generator, then go to the next step. |
| | | No | Go to the next step. |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P2504 COMPLETED**<br>• Make sure to reconnect all connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Perform the KOER self-test.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Ares any DTCs present? | Yes | Go to the applicable DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

**DTC P2507[L3 WITH TC]**

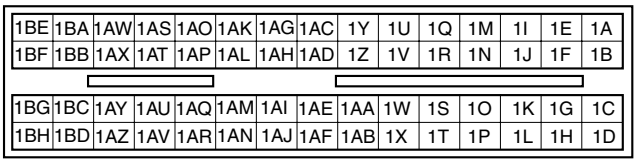
id010239814300

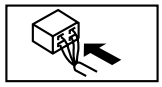
| DTC P2507 | PCM +BB (back-up battery) voltage low |
|---|---|
| **DETECTION CONDITION** | • The PCM monitors the voltage of the back-up battery positive terminal. If the PCM detects that the battery positive terminal voltage is**below 2.5 V for2 s, the PCM determines that the backup voltage circuit has a malfunction.**<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| **POSSIBLE CAUSE** | • Melt down EEC fuse<br>• Open circuit in the wiring harness between the EEC fuse and PCM terminal 1BA<br>• Short to ground between the EEC fuse and PCM terminal 1BA<br>• Poor connection of the PCM connector.<br>• PCM malfunction |

| DTC P2507 | PCM +BB (back-up battery) voltage low |
|---|---|




PCM
WIRING HARNESS SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Check for related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT EEC FUSE**<br>• Turn the ignition switch to off.<br>• Inspect the EEC fuse for failure and proper.<br>• Is it normal? | Yes | Go to step 6. |
| | | No | • If the EEC fuse has been melt down, then go to the next step.<br>• If the EEC fuse is not installed correctly, install it correctly then go to Step 7. |
| 4 | **INSPECT MONITOR CIRCUIT FOR SHORT TO GROUND**<br>• Disconnect the battery cables.<br>• Inspect for continuity between EEC fuse terminal and body ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground and install new fuse, then go to Step 7. |
| | | No | Go to step 7. |
| 5 | **INSPECT PCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the PCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Is there any malfunction? | Yes | Repair the terminals, then go to Step 7. |
| | | No | Go to the next step. |
| 6 | **INSPECT MONITOR CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the battery cables.<br>• Inspect for continuity between EEC fuse terminal and PCM terminal 1BA (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2507 COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Turn the ignition switch to the ON position (Engine off).<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Troubleshooting completed. |

### DTC P2610[L3 WITH TC]

id010239814400

| DTC P2610 | PCM internal engine off timer performance |
|---|---|
| DETECTION CONDITION | • PCM internal engine off timer is damaged.<br>**Diagnostic support note**<br>• This is a continuous monitor (CCM).<br>• MIL illuminates if the PCM detects the above malfunction condition in two consecutive drive cycles or in one drive cycle while the DTC for the same malfunction has been stored in the PCM.<br>• PENDING CODE is available if the PCM detects the above malfunction condition during the first drive cycle.<br>• FREEZE FRAME DATA is available.<br>• DTCs are stored in the PCM memory. |
| POSSIBLE CAUSE | • PCM internal engine off timer is damaged. |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform the repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P2610 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the PCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the PCM, then go to the next step.<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “AFTER REPAIR PROCEDURE”.<br>(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC troubleshooting.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | DTC troubleshooting completed. |

# 01-03 SYMPTOM TROUBLESHOOTING [L3 WITH TC]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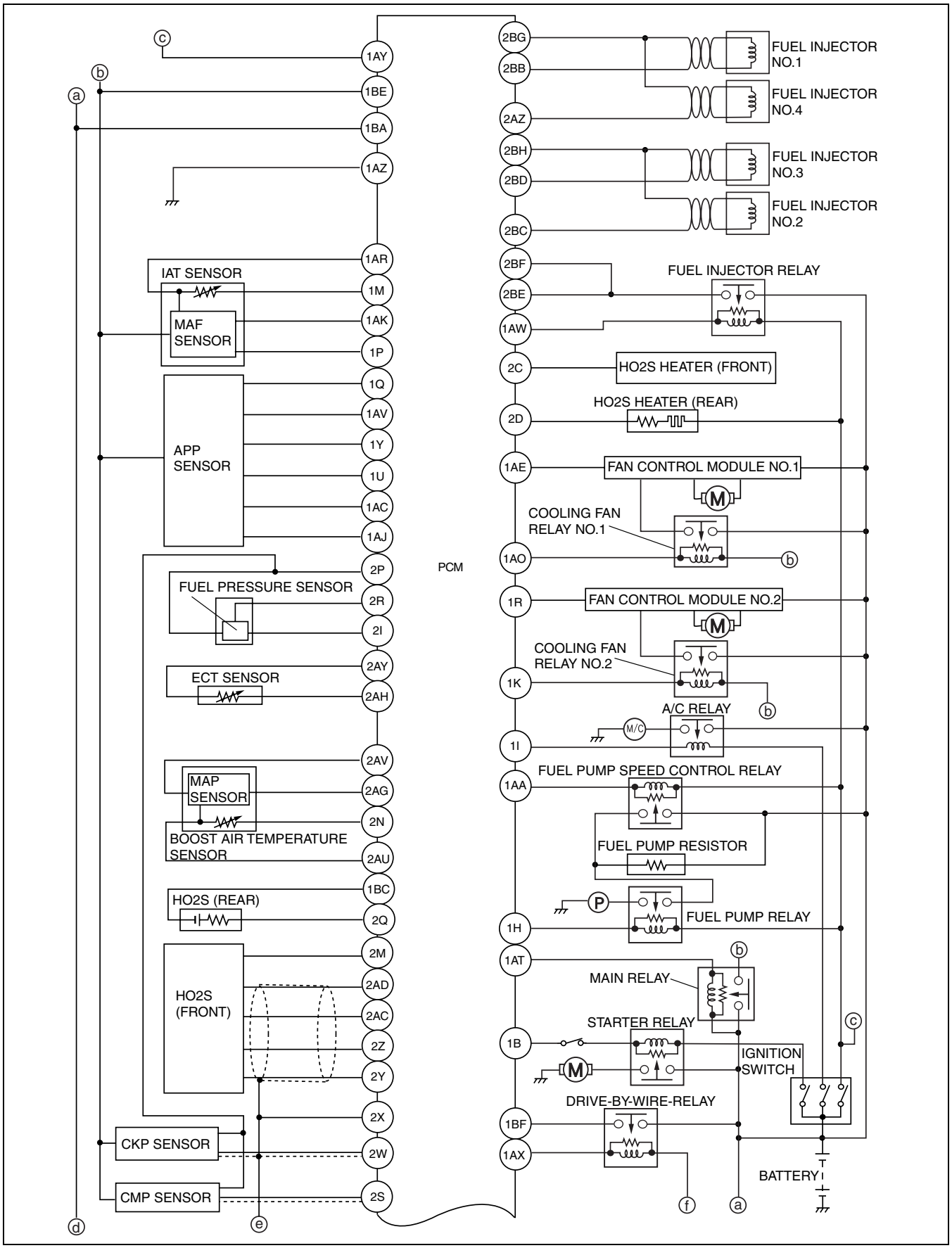
## SYMPTOM TROUBLESHOOTING WIRING DIAGRAM[L3 WITH TC]

id010339800100

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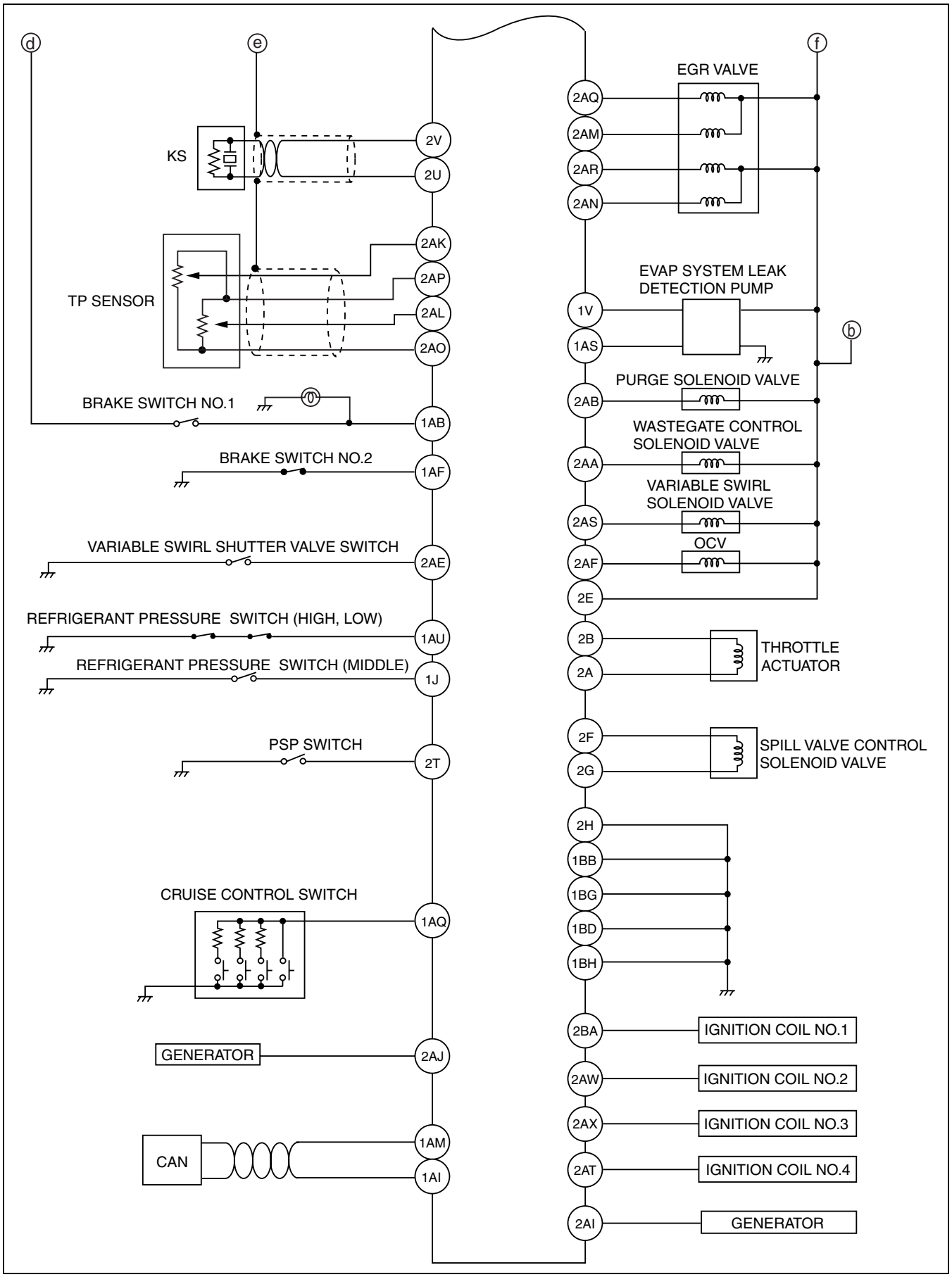


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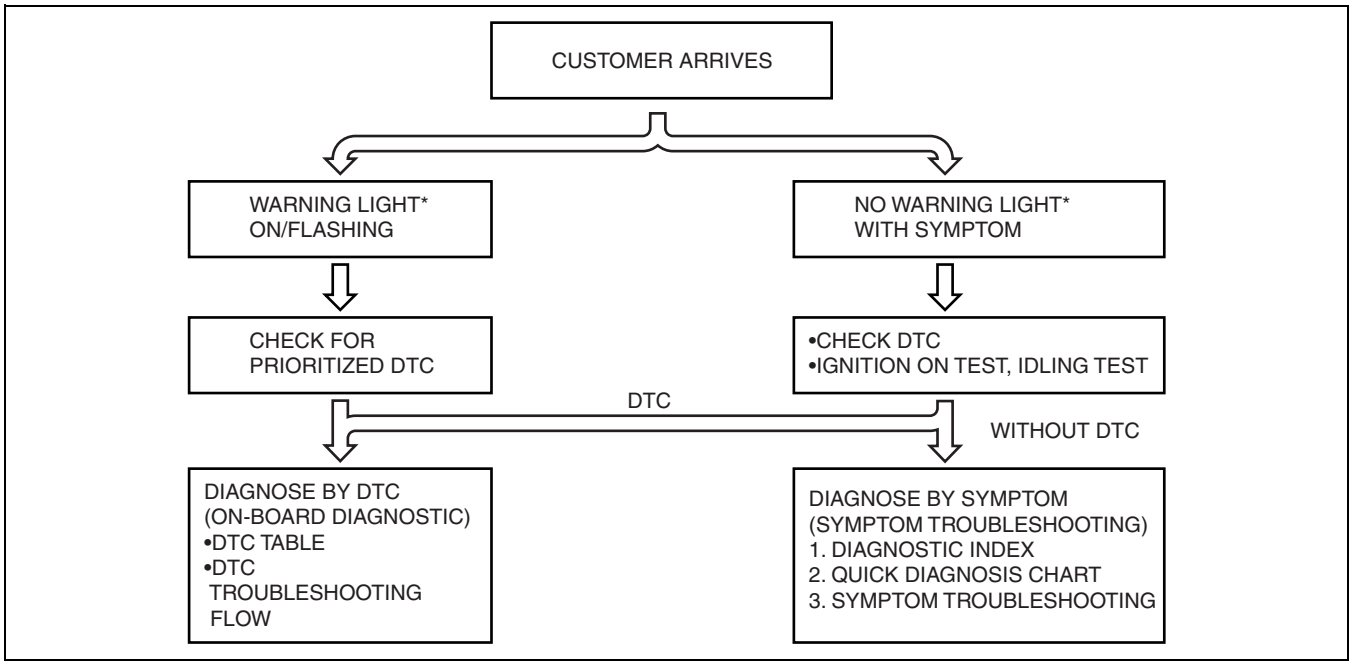
## FOREWORD[L3 WITH TC]

id010339800300

- When the customer reports a vehicle malfunction, check the malfunction indicator lamp (MIL) indication and diagnostic trouble code (DTC), then diagnose the malfunction according to the following flowchart:
  - — If a DTC exists, diagnose the applicable DTC inspection. (See 01-02-13 DTC TABLE[L3 WITH TC].)
  - — If no DTC exists and the MIL does not illuminate or flash, diagnose the applicable symptom troubleshooting. (See 01-03-8 QUICK DIAGNOSTIC CHART[L3 WITH TC].)

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*: Malfunction Indicator Lamp (MIL), Generator Warning Light, Security Light

## ENGINE SYMPTOM TROUBLESHOOTING[L3 WITH TC]

id010339800500

- Verify malfunction symptoms using the following diagnostic index, then go to the appropriate troubleshooting chart.

**Diagnostic Index**

| No. | TROUBLESHOOTING ITEM | | DESCRIPTION |
|---|---|---|---|
| 1 | Melting of main or other fuses | | — |
| 2 | MIL illuminates | | MIL is illuminated. |
| 3 | Will not crank | | Starter does not work. |
| 4 | Hard to start/long crank/erratic start/erratic crank | | Starter cranks engine at normal speed but engine requires excessive cranking time before starting. |
| 5 | Engine stalls. | After start/at idle | Engine stops unexpectedly at idle or after start or both. |
| 6 | Cranks normally but will not start | | Starter cranks engine at normal speed but engine will not run. |
| 7 | Slow return to idle | | Engine takes more time than normal to return to idle speed. |
| 8 | Engine runs rough/rolling idle | | Engine speed fluctuates between specified idle speed and lower speed and engine shakes excessively. |
| 9 | Fast idle/runs on | | Engine speed continues at fast idle after warm-up.<br>Engine runs after ignition switch is turned off. |
| 10 | Low idle/stalls during deceleration | | Engine stops unexpectedly at beginning of deceleration or recovery from deceleration. |
| 11 | Engine stalls/quits. | Acceleration/cruise | Engine stops unexpectedly at beginning of acceleration or during acceleration.<br>Engine stops unexpectedly while cruising. |
| | Engine runs rough. | Acceleration/cruise | Engine speed fluctuates during acceleration or cruising. |
| | Misses | Acceleration/cruise | Engine misses during acceleration or cruising. |
| | Buck/jerk | Acceleration/cruise/ deceleration | Vehicle bucks/jerks during acceleration, cruising, or deceleration. |
| | Hesitation/stumble | Acceleration | Momentary pause at beginning of acceleration or during acceleration |
| | Surges | Acceleration/cruise | Momentary minor irregularity in engine output |
| 12 | Lack/loss of power | Acceleration/cruise | Performance is poor under load.<br>(e.g., power down when climbing hills) |
| 13 | Knocking/pinging | Acceleration/cruise | Sound is produced when air/fuel mixture is ignited by something other than spark plug. (e.g., hot spot in combustion chamber) |
| 14 | Poor fuel economy | | Fuel economy is unsatisfactory. |
| 15 | Emission compliance | | Fails emissions test. |
| 16 | High oil consumption/leakage | | Oil consumption is excessive. |
| 17 | Cooling system concerns | Overheating | Engine runs at higher than normal temperature/overheats. |
| 18 | Cooling system concerns | Runs cold | Engine does not reach normal operating temperature. |
| 19 | Exhaust smoke | | Blue, black, or white smoke from exhaust system |
| 20 | Fuel odor (in engine compartment) | | Gasoline fuel smell or visible leakage |
| 21 | Engine noise | | Engine noise from under hood |
| 22 | Vibration concerns (engine) | | Vibration from under hood or driveline |
| 23 | A/C does not work sufficiently. | | A/C compressor magnetic clutch does not engage when A/C is turned on. |
| 24 | A/C is always on or A/C compressor runs continuously. | | A/C compressor magnetic clutch does not disengage. |
| 25 | A/C is not cut off under WOT conditions. | | A/C compressor magnetic clutch does not disengage under WOT. |
| 26 | Exhaust sulphur smell | | Rotten egg smell (sulphur) from exhaust |
| 27 | Fuel refill concerns | | Fuel tank does not fill smoothly. |
| 28 | Fuel filling shut off issues | | Fuel does not shut off properly. |
| 29 | Spark plug condition | | Incorrect spark plug condition |

## CONTROL SYSTEM DEVICE AND CONTROL RELATIONSHIP CHART[L3 WITH TC]

id010339800200

X: Applied

| Item | ELECTRONIC THROTTLE CONTROL | IAC | VARIABLE SWIRL CONTROL | VARIABLE VALVE TIMING CONTROL | FUEL INJECTION CONTROL | FUEL PUMP CONTROL | ESA CONTROL | EGR CONTROL | EVAPORATIVE PURGE CONTROL | HO2S HEATER CONTROL | A/C CUT-OFF CONTROL | ELECTRICAL FAN CONTROL | STARTER CUT-OFF CONTROL | GENERATOR CONTROL | CRUISE CONTROL | CAN | HIGH PRESSURE FUEL PUMP CONTROL | WASTEGATE CONTROL | FUEL PUMP SPEED CONTROL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Input device** | | | | | | | | | | | | | | | | | | | |
| IAT sensor | X | X | | | X | | X | | X | | | | | X | | | X | X | X |
| MAF sensor | X | X | X | X | X | | X | X | X | X | | X | | | | | X | X | X |
| TP sensor No.1, No.2 | X | X | | | X | | X | X | | | X | | | | | | | X | X |
| APP sensor No.1, No.2 | X | X | X | X | X | | X | X | X | | X | X | | | | | | | |
| MAP sensor | X | X | | | X | | | | X | | X | | | | | | | | |
| ECT sensor | X | X | X | X | X | | X | X | X | X | X | X | | X | | | | | X |
| CMP sensor | | X | | X | X | | X | | | | | | | | | | X | | |
| CKP sensor | X | X | X | X | X | X | X | X | X | X | X | X | | X | | | X | X | X |
| KS | | | | | | | X | | | | | | | | | | | | |
| HO2S (front, rear) | | | | | X | | | | X | | | | | | | | | | X |
| BARO sensor | X | X | | | X | | | | X | | | X | | | | | | X | X |
| Neutral switch | X | X | | | X | | X | X | X | | X | | | | X | | | X | |
| CPP switch | X | X | | | X | | X | X | X | | X | | | | X | | | X | |
| Brake switch | | X | | | X | | X | | | | | | | | X | | | | |
| Instrument cluster (A/C on request signal) | | X | | | | | | | | | X | X | | | | | | | |
| Refrigerant pressure switch (low pressure switch, high pressure switch) | | X | | | | | | | | | X | X | | | | | | | |
| Refrigerant pressure switch (medium pressure switch) | | X | | | | | | | | | | X | | | | | | | |
| Battery | X | | | X | | X | X | X | X | X | | | | X | | | X | X | X |
| Generator (Terminal P: starter coil) | | X | | | | | | | | | | | | X | | | | | |
| Vehicle speed signal | X | X | | | X | | X | X | | | | X | | X | X | X | | | |
| Cruise control switch | | | | | | | | | | | | | | | X | | | | |
| Instrument cluster (CAN signal) | X | X | | | X | | X | | | X | | | X | | | X | | | |
| Ignition switch | | | | X | X | X | X | X | | X | | X | | | | | | | |
| Fuel pressure sensor | X | | | | X | X | | | | | | | | | | | X | | |
| Boost air temperature sensor | | X | | | X | | X | X | | | | | | | | | X | | |
| **Output device** | | | | | | | | | | | | | | | | | | | |
| Throttle actuator | X | X | | | | | | | | | | | | | X | | | | |
| Drive-by-wire-relay | X | | | | | | | | | | | | | | | | | | |

| Item | ELECTRONIC THROTTLE CONTROL | IAC | VARIABLE SWIRL CONTROL | VARIABLE VALVE TIMING CONTROL | FUEL INJECTION CONTROL | FUEL PUMP CONTROL | ESA CONTROL | EGR CONTROL | EVAPORATIVE PURGE CONTROL | HO2S HEATER CONTROL | A/C CUT-OFF CONTROL | ELECTRICAL FAN CONTROL | STARTER CUT-OFF CONTROL | GENERATOR CONTROL | CRUISE CONTROL | CAN | HIGH PRESSURE FUEL PUMP CONTROL | WASTEGATE CONTROL | FUEL PUMP SPEED CONTROL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variable swirl shutter valve actuator | | | X | | | | | | | | | | | | | | | | |
| OCV | | | | X | | | | | | | | | | | | | | | |
| Injector driver module | | | | | X | | | | | | | | | | | | | | |
| Fuel pump relay | | | | | | X | | | | | | | | | | | | | |
| Ignition coil | | | | | | | X | | | | | | | | | | | | |
| EGR valve | | | | | | | | X | | | | | | | | | | | |
| Purge solenoid valve | | | | | | | | | X | | | | | | | | | | |
| HO2S heater (front, rear) | | | | | | | | | | X | | | | | | | | | |
| A/C relay | | | | | | | | | | | X | | | | | | | | |
| Fan control module | | | | | | | | | | | | X | | | | | | | |
| Starter relay | | | | | | | | | | | | | X | X | | | | | |
| Generator (Terminal D: field coil) | | | | | | | | | | | | | | X | | | | | |
| ABS HU/CM (With ABS) (CAN signal) | | | | | | | | | | | | | | | | X | | | |
| Instrument cluster (CAN signal) | | | | | | | | | | | | | | | | X | | | |
| Spill valve control solenoid valve | | | | | | | | | | | | | | | | | X | | |
| Wastegate control solenoid valve | | | | | | | | | | | | | | | | | | X | |
| Fuel pump speed control relay | | | | | | | | | | | | | | | | | | | X |

## QUICK DIAGNOSTIC CHART[L3 WITH TC]

id0103398006OO

X: Applied

| | Possible factor / Troubleshooting item | | Starter motor malfunction (Mechanical or electrical) | Starter circuit including ignition switch is open | Improper engine oil level | Low or dead battery | Charging system malfunction | Improper engine compression | Improper dipstick | Base engine malfunction | Flywheel is seized | Improper tension or damaged drive belts | Improper engine coolant level | Water and anti-freeze mixture is improper | Cooling system malfunction (Radiator, hoses,overflow system, thermostat, etc.) | Cooling fan system malfunction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | | | | |
| 2 | MIL illuminates | | | | | | | | | | | | | | | |
| 3 | Will not crank | | X | X | | X | X | | | X | X | | | | | |
| 4 | Hard start/long crank/erratic start/erratic crank | | X | | | | | X | | X | | | | | | |
| 5 | Engine stalls | After start/at idle | | | | | | X | | | | | | | | |
| 6 | Cranks normally but will not start | | | | | | | X | | | | | | | | |
| 7 | Slow return to idle | | | | | | | | | | | | | | X | X |
| 8 | Engine runs rough/rolling idle | | | | | | | X | | | | | | | | |
| 9 | Fast/idle runs on | | | | | | | | | | | | | | | |
| 10 | Low idle/stalls during deceleration | | | | | | | X | | | | | | | | |
| 11 | Engine stalls/quits | Acceleration/cruise | | | | | | X | | | | | | | | |
| | Engine runs rough | Acceleration/cruise | | | | | | X | | | | | | | | |
| | Misses | Acceleration/cruise | | | | | | X | | | | | | | | |
| | Buck/jerk | Acceleration/cruise/ deceleration | | | | | | X | | | | | | | | |
| | Hesitation/stumble | Acceleration/cruise | | | | | | X | | | | | | | | |
| | Surges | Acceleration/cruise | | | | | | X | | | | | | | | |
| 12 | Lack/loss of power | Acceleration/cruise | | | | | | X | | | | | | | | |
| 13 | Knocking/pinging | Acceleration/cruise | | | | | | X | | | | | | | | X |
| 14 | Poor fuel economy | | | | | | | X | | | | | X | | X | X |
| 15 | Emission compliance | | | | | | | X | | X | | | | | X | |
| 16 | High oil consumption/leakage | | | | | | | | X | X | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | X | X | X | X | X |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | X | X |
| 19 | Exhaust smoke | | | | | | | X | | X | | | | | X | |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | | | | |
| 21 | Engine noise | | | | | | | | | | | X | | | | |
| 22 | Vibration concerns (engine) | | | | | | | | | | | | | | | |
| 23 | A/C does not work sufficiency | | | | | | | | | | | | | | | |
| 24 | A/C always on or A/C compressor runs continuously. | | | | | | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | | | | | | | | | | | | |
| 27 | Fuel refill concerns | | | | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | | | | |
| 29 | Spark plug condition | | | | | | | X | | | | | | | | |

acxuuw00000310

X: Applied

| | Troubleshooting item / Possible factor | | | Engine or transaxle mounts are improperly installed. | Cooling fan or condenser fan seats are improper. | Fuel quality | Improper engine oil viscosity | Improper valve timing | Oil leakage (internal, turbocharger, external) | Improper oil or fluid level | Coolant leakage (internal, turbocharger, external) | Variable valve timing system malfunction | Variable tumble control system malfunction | Engine overheating | Air cleaner element clogging or restriction | Air leakage from intake-air system (loose tubes, cracks, gaskets blockage) | Air suction in intake-air system | Intake-air system restriction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | | | | | | |
| 2 | MIL illuminates | | | | | | | | | | | X | X | | | | | |
| 3 | Will not crank | | | | | | | | | | | | | | | | | |
| 4 | Hard start/long crank/erratic start/erratic crank | | | | | X | | X | | | | | | | X | X | | X |
| 5 | Engine stalls | After start/at idle | | | | X | | | | | | X | | X | | X | | X |
| 6 | Cranks normally but will not start | | | | | X | | X | | | | | | X | X | X | | X |
| 7 | Slow return to idle | | | | | | | | | | | | | | | | X | |
| 8 | Engine runs rough/rolling idle | | | | | X | | X | | | | | | X | | X | | X |
| 9 | Fast/idle runs on | | | | | | | | | | | X | | | | X | | |
| 10 | Low idle/stalls during deceleration | | | | | | | X | | | | | | | | X | | X |
| 11 | Engine stalls/quits | Acceleration/cruise | | | | X | | X | | | | | X | X | X | | | X |
| | Engine runs rough | Acceleration/cruise | | | | X | | X | | | | | X | X | X | | | X |
| | Misses | Acceleration/cruise | | | | X | | X | | | | | X | X | X | | | X |
| | Buck/jerk | Acceleration/cruise/ deceleration | | | | X | | X | | | | | X | X | X | | | X |
| | Hesitation/stumble | Acceleration/cruise | | | | X | | X | | | | | X | X | X | | | X |
| | Surges | Acceleration/cruise | | | | X | | X | | | | | X | X | X | | | X |
| 12 | Lack/loss of power | Acceleration/cruise | | | | X | | X | | | | X | X | X | X | X | | X |
| 13 | Knocking/pinging | Acceleration/cruise | | | | X | | | | | | | | X | | X | | |
| 14 | Poor fuel economy | | | | | X | | X | | | | | | | X | | | |
| 15 | Emission compliance | | | | | X | | X | | | | | | X | X | X | | |
| 16 | High oil consumption/leakage | | | | | | X | | X | | | | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | X | | | | | | | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | | | | |
| 19 | Exhaust smoke | | | | | | | | X | | X | | | | X | X | | |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | | | | | | |
| 21 | Engine noise | | | | | | | | | X | | | | | | | | |
| 22 | Vibration concerns (engine) | | | X | X | | | | | | | | | | | | | |
| 23 | A/C does not work sufficiency | | | | | | | | | | | | | | | | | |
| 24 | A/C always on or A/C compressor runs continuously. | | | | | | | | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | | X | | | | | | | | | | | | |
| 27 | Fuel refill concerns | | | | | | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | | | | | | |
| 29 | Spark plug condition | | | | | | | | | | | | | | X | | | |

acxuuw00000311

X: Applied

| | Possible factor / Troubleshooting item | | Electronic throttle control improper operation | Throttle body malfunction | Vacuum leakage (Vacuum hose damage, misrouting) | Turbocharger malfunction | Improper operation of wastegate system | Charge air cooler malfunction | Ignition coil malfunction (e.g. open, short or cracks) | Initial ignition timing misadjustment (CKP and pulse wheel misadjustment) | Spark plug malfunction | Fuel pump (low-pressure side) malfunction (Mechanically or electrically) | Pressure regulator (built-in fuel pump unit at fuel tank) | Inadequate fuel pressure (High-pressure side) | Inadequate fuel pressure (Low-pressure side) | Fuel line restriction or clogging |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | | | | |
| 2 | MIL illuminates | | X | | | | | | | | | | | | | |
| 3 | Will not crank | | | | | | | | | | | | | | | |
| 4 | Hard start/long crank/erratic start/erratic crank | | X | | X | | | | X | X | X | X | | X | X | X |
| 5 | Engine stalls | After start/at idle | X | | X | | | | X | | | X | | X | X | X |
| 6 | Cranks normally but will not start | | X | | X | | | | X | | X | X | | X | X | X |
| 7 | Slow return to idle | | | | | | | | | | | | | X | X | |
| 8 | Engine runs rough/rolling idle | | X | | X | | | | X | | X | X | | X | X | |
| 9 | Fast/idle runs on | | X | X | | | | | | | | | | | | |
| 10 | Low idle/stalls during deceleration | | X | | X | | | | | | | | | X | X | X |
| 11 | Engine stalls/quits | Acceleration/cruise | X | X | X | X | X | | | | X | X | | X | X | X |
| | Engine runs rough | Acceleration/cruise | X | X | X | X | X | | | | X | X | | X | X | X |
| | Misses | Acceleration/cruise | X | X | X | X | X | | | | X | X | | X | X | X |
| | Buck/jerk | Acceleration/cruise/ deceleration | X | X | X | X | X | | | | X | X | | X | X | X |
| | Hesitation/stumble | Acceleration/cruise | X | X | X | X | X | | | | X | X | | X | X | X |
| | Surges | Acceleration/cruise | X | X | X | X | X | | | | X | X | | X | X | X |
| 12 | Lack/loss of power | Acceleration/cruise | X | X | X | X | X | X | X | | X | X | | X | X | X |
| 13 | Knocking/pinging | Acceleration/cruise | X | | | | X | X | X | | | | | X | X | |
| 14 | Poor fuel economy | | | | X | X | | X | X | | X | | | X | X | X |
| 15 | Emission compliance | | X | X | X | X | X | X | | | X | | | X | X | |
| 16 | High oil consumption/leakage | | | | | X | | | | | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | | | | | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | | |
| 19 | Exhaust smoke | | | | | | X | | X | | X | | | X | X | |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | | X | X | |
| 21 | Engine noise | | | | X | X | | | | | | | | | | |
| 22 | Vibration concerns (engine) | | | | | | | | | | | | | | | |
| 23 | A/C does not work sufficiency | | | | | | | | | | | | | | | |
| 24 | A/C always on or A/C compressor runs continuously. | | | | | | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | X | | | | | | | | | X | X | |
| 27 | Fuel refill concerns | | | | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | | | | |
| 29 | Spark plug condition | | | | | | | | | | X | X | X | X | X | X |

acxuuw00000312

X: Applied

| Troubleshooting item | | | Possible factor: Fuel injector malfunction (inoperative) | Fuel filters restriction or clogging | Fuel pressure limiter malfunction (built-in common rail) | Spill valve control solenoid valve malfunction (built-in high pressure fuel pump) | Fuel leakage at fuel line | High pressure fuel pump malfunction | Incorrect fuel injection timing or amount | Improper air/fuel ratio mixture control | Fuel pump resister or related circuit malfunction | Exhaust system or catalytic converter restriction | Exhaust gas leakage | Catalytic converter malfunction | EGR system malfunction | EVAP control system malfunction | PCV valve malfunction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | | | | | |
| 2 | MIL illuminates | | X | | | | | | | X | | | | X | X | X | |
| 3 | Will not crank | | | | | | | | | | | | | | | | |
| 4 | Hard start/long crank/erratic start/erratic crank | | X | X | X | X | X | X | X | X | | X | | | X | X | X |
| 5 | Engine stalls | After start/at idle | X | | X | X | X | X | X | X | X | X | | | X | X | X |
| 6 | Cranks normally but will not start | | X | | X | X | X | X | X | X | X | X | | | X | X | X |
| 7 | Slow return to idle | | X | | X | | | | X | | | | | | | | |
| 8 | Engine runs rough/rolling idle | | X | X | X | X | X | X | | | | X | | | X | X | X |
| 9 | Fast/idle runs on | | X | | | X | | | | | | | | | | | |
| 10 | Low idle/stalls during deceleration | | X | | X | X | X | X | X | | | | | | X | X | |
| 11 | Engine stalls/quits | Acceleration/cruise | X | | X | X | | X | X | X | X | X | | | X | X | X |
| | Engine runs rough | Acceleration/cruise | X | | X | X | | X | X | X | X | X | | | X | X | X |
| | Misses | Acceleration/cruise | X | | X | X | | X | X | X | X | X | | | X | X | X |
| | Buck/jerk | Acceleration/cruise/ deceleration | X | | X | X | | X | X | X | X | X | | | X | X | X |
| | Hesitation/stumble | Acceleration/cruise | X | | X | X | | X | X | X | X | X | | | X | X | X |
| | Surges | Acceleration/cruise | X | | X | X | | X | X | X | X | X | | | X | X | X |
| 12 | Lack/loss of power | Acceleration/cruise | | | X | X | | X | X | | X | X | X | | X | X | X |
| 13 | Knocking/pinging | Acceleration/cruise | X | | | X | | | X | | | X | | | X | | |
| 14 | Poor fuel economy | | X | X | | | X | X | X | | | X | | | X | | X |
| 15 | Emission compliance | | X | | X | X | | X | X | X | | X | | X | X | X | X |
| 16 | High oil consumption/leakage | | | | | | | | | | | | | | | | X |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | | | | | | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | | | |
| 19 | Exhaust smoke | | X | | | | | | X | | | | X | | | | X |
| 20 | Fuel odor (in engine compartment) | | X | | | | X | | | | | | | | | X | |
| 21 | Engine noise | | | | | | | | | | | | | | | | |
| 22 | Vibration concerns (engine) | | | | | | | | | | | | | | | | |
| 23 | A/C does not work sufficiency | | | | | | | | | | | | | | | | |
| 24 | A/C always on or A/C compressor runs continuously. | | | | | | | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | | | | | | | | | | | | X | |
| 27 | Fuel refill concerns | | | | | | | | | | | | | | | X | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | | | | X | |
| 29 | Spark plug condition | | X | | | | X | | | X | | X | | | | | |

acxuuw00000313

X: Applied

| Troubleshooting item | | | Nonreturn valve malfunction | Fuel shut off valve malfunction | Constant voltage supply circuit malfunction | Main relay malfunction (mechanically or electrically) | No battery power supply to PCM | Poor PCM ground or vehicle ground (open) | Electrical connector disconnection | ECT sensor or related circuit malfunction | Brake switch or related circuit malfunction | Front or rear HO2S sensor or related circuit malfunction | IAT sensor 1 (integrated in MAF sensor) or related circuit malfunction | Boost air temperature sensor (integrated in MAP sensor) or related circuit malfunction | Fuel pressure sensor or related circuit malfunction | MAP sensor or related circuit malfunction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | | | | |
| 2 | MIL illuminates | | | | | | | | X | X | X | X | X | X | X | X |
| 3 | Will not crank | | | | | X | | | | | | | | | | |
| 4 | Hard start/long crank/erratic start/erratic crank | | | | | | | | | X | | X | | | X | |
| 5 | Engine stalls | After start/at idle | | | | | X | X | | X | | X | | | X | |
| 6 | Cranks normally but will not start | | | | | | | | X | X | | X | | | X | |
| 7 | Slow return to idle | | | | | | | | | X | | | | | X | |
| 8 | Engine runs rough/rolling idle | | | | | | | | X | X | | | | | X | X |
| 9 | Fast/idle runs on | | | | | | | | | X | | | | | | |
| 10 | Low idle/stalls during deceleration | | | | | | | | | X | X | X | | | X | |
| 11 | Engine stalls/quits | Acceleration/cruise | | | | X | | | | X | | | X | X | X | X |
| | Engine runs rough | Acceleration/cruise | | | | X | | | | X | | | X | X | X | X |
| | Misses | Acceleration/cruise | | | | X | | | | X | | | X | X | X | X |
| | Buck/jerk | Acceleration/cruise/ deceleration | | | | X | | | | X | | | X | X | X | X |
| | Hesitation/stumble | Acceleration/cruise | | | | X | | | | X | | | X | X | X | X |
| | Surges | Acceleration/cruise | | | | X | | | | X | | | X | X | X | X |
| 12 | Lack/loss of power | Acceleration/cruise | | | | | | | | X | | | X | X | X | X |
| 13 | Knocking/pinging | Acceleration/cruise | | | | | | | | | | | X | X | X | X |
| 14 | Poor fuel economy | | | | | | | | | X | | | X | X | X | X |
| 15 | Emission compliance | | | | | | | | | X | | X | X | X | X | X |
| 16 | High oil consumption/leakage | | | | | | | | | | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | | | | | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | | |
| 19 | Exhaust smoke | | | | | | | | | X | | X | X | X | | X |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | | | | |
| 21 | Engine noise | | | | | | | | | | | | | | | |
| 22 | Vibration concerns (engine) | | | | | | | | | | | | | | | |
| 23 | A/C does not work sufficiency | | | | | | | | | | | | | | | |
| 24 | A/C always on or A/C compressor runs continuously. | | | | | | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | | | | | X | | | | | | | |
| 27 | Fuel refill concerns | | X | X | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | X | X | | | | | | | | | | | | |
| 29 | Spark plug condition | | | | X | | | | | | | | | | X | X |

acxuuw00000314

X: Applied

| | Possible factor / Troubleshooting item | | CMP sensor damaged (e.g.open or short circuit) | CMP sensor pulse wheel (camshaft) is damaged | Improper gap between CKP sensor and pulse wheel | CKP sensor damaged (e.g.open or short circuit) | CKP sensor pulse wheel damaged | TR switch misadjustment | P/N position switch in TR switch open | MAF sensor or related circuit malfunction | Knock sensor or related circuit malfunction | TP sensor or related circuit malfunction | Accelerator position sensor or related circuit malfunction | P/S pressure switch or related circuit malfunction | Improper vehicle speed signal | Cruise control system operation improperly | A/C system improper operation | Improper refrigerant charging amount | A/C relay (A/C control signal circuit) malfunction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | | | | | | | |
| 2 | MIL illuminates | | x | | x | | | | | x | x | x | x | x | x | | | | |
| 3 | Will not crank | | | | | | | x | x | | | | | | | | | | |
| 4 | Hard start/long crank/erratic start/erratic crank | | x | x | x | x | x | | | x | | | | | | | | | |
| 5 | Engine stalls | After start/at idle | x | x | x | x | x | | | x | | | x | | | | x | x | x |
| 6 | Cranks normally but will not start | | x | x | x | x | x | | | x | | | x | | | | | | |
| 7 | Slow return to idle | | x | x | x | x | x | | | x | | | x | x | | | | | x |
| 8 | Engine runs rough/rolling idle | | x | x | x | x | x | | | x | | | x | x | | | x | x | x |
| 9 | Fast/idle runs on | | | | | | | | | | | | x | x | | x | | | x |
| 10 | Low idle/stalls during deceleration | | x | x | x | x | x | | x | x | | x | x | | | | x | | |
| 11 | Engine stalls/quits | Acceleration/cruise | x | x | x | x | x | | | x | | x | x | | x | | x | | |
| | Engine runs rough | Acceleration/cruise | x | x | x | x | x | | | x | | x | x | | x | | x | | |
| | Misses | Acceleration/cruise | x | x | x | x | x | | | x | | x | x | | x | | x | | |
| | Buck/jerk | Acceleration/cruise/ deceleration | x | x | x | x | x | | | x | | x | x | | x | | x | | |
| | Hesitation/stumble | Acceleration/cruise | x | x | x | x | x | | | x | | x | x | | x | | x | | |
| | Surges | Acceleration/cruise | x | x | x | x | x | | | x | | x | x | | x | | x | | |
| 12 | Lack/loss of power | Acceleration/cruise | x | x | x | x | x | | | x | | | x | | x | | x | | x |
| 13 | Knocking/pinging | Acceleration/cruise | x | x | | | | | | x | x | | x | | | | | | |
| 14 | Poor fuel economy | | x | x | x | x | x | | | x | | | x | | x | | x | | |
| 15 | Emission compliance | | x | x | x | x | x | | | x | | x | x | | x | | | | |
| 16 | High oil consumption/leakage | | | | | | | | | | | | | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | | | | | | x | x | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | | | | | | | |
| 19 | Exhaust smoke | | | | x | | | | | x | | x | x | | x | | | | |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | | | | | | | |
| 21 | Engine noise | | | | | | | | | | | | | | | | | | |
| 22 | Vibration concerns (engine) | | | | | | | | | | | | | | | | | | |
| 23 | A/C does not work sufficiency | | | | | | | | | | | | | | | | x | x | x |
| 24 | A/C always on or A/C compressor runs continuously. | | | | | | | | | | | | | | | | x | | x |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | x | | | | | | |
| 26 | Exhaust sulphur smell | | | | | | | | | | | | | | | | | | |
| 27 | Fuel refill concerns | | | | | | | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | | | | | | | |
| 29 | Spark plug condition | | | | | | | | | x | | | | | | | | | |

acxuuw00000315

X: Applied

| Troubleshooting item | | | Possible factor: A/C compressor magnetic clutch malfunction | ATX related parts malfunction | Improper ATF level | Brake dragging | Loose parts | Improper balance of wheels and tires | Drive line malfunction | Suspension malfunction | Immobilizer system operating properly | Immobilizer system or related circuit malfunction | Advanced keyless entry system malfunction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Melting of main or other fuses | | | | | | | | | | | | |
| 2 | MIL illuminates | | | | | | | | | | | | |
| 3 | Will not crank | | | | | | | | | | X | X | X |
| 4 | Hard start/long crank/erratic start/erratic crank | | | | | | | | | | | | |
| 5 | Engine stalls | After start/at idle | | | | | | | | | | X | |
| 6 | Cranks normally but will not start | | | | | | | | | | | X | |
| 7 | Slow return to idle | | | | | | | | | | | | |
| 8 | Engine runs rough/rolling idle | | | | | | | | | | | | |
| 9 | Fast/idle runs on | | | | | | | | | | | | |
| 10 | Low idle/stalls during deceleration | | X | | | | | | | | | | |
| 11 | Engine stalls/quits | Acceleration/cruise | | X | | | | | | | | | |
| | Engine runs rough | Acceleration/cruise | | X | | | | | | | | | |
| | Misses | Acceleration/cruise | | X | | | | | | | | | |
| | Buck/jerk | Acceleration/cruise/ deceleration | | X | | | | | | | | | |
| | Hesitation/stumble | Acceleration/cruise | | X | | | | | | | | | |
| | Surges | Acceleration/cruise | | X | | | | | | | | | |
| 12 | Lack/loss of power | Acceleration/cruise | | X | | X | | | | | | | |
| 13 | Knocking/pinging | Acceleration/cruise | | | | | | | | | | | |
| 14 | Poor fuel economy | | | | X | X | | | | | | | |
| 15 | Emission compliance | | | | | | | | | | | | |
| 16 | High oil consumption/leakage | | | | | | | | | | | | |
| 17 | Cooling system concerns | Overheating | | | | | | | | | | | |
| 18 | Cooling system concerns | Runs cold | | | | | | | | | | | |
| 19 | Exhaust smoke | | | | | | | | | | | | |
| 20 | Fuel odor (in engine compartment) | | | | | | | | | | | | |
| 21 | Engine noise | | | | | | X | | | | | | |
| 22 | Vibration concerns (engine) | | | | | | X | X | X | X | | | |
| 23 | A/C does not work sufficiency | | X | | | | | | | | | | |
| 24 | A/C always on or A/C compressor runs continuously. | | X | | | | | | | | | | |
| 25 | A/C does not cut off under wide open throttle | | | | | | | | | | | | |
| 26 | Exhaust sulphur smell | | | | | | | | | | | | |
| 27 | Fuel refill concerns | | | | | | | | | | | | |
| 28 | Fuel filling shut off issues | | | | | | | | | | | | |
| 29 | Spark plug condition | | | | | | | | | | | | |

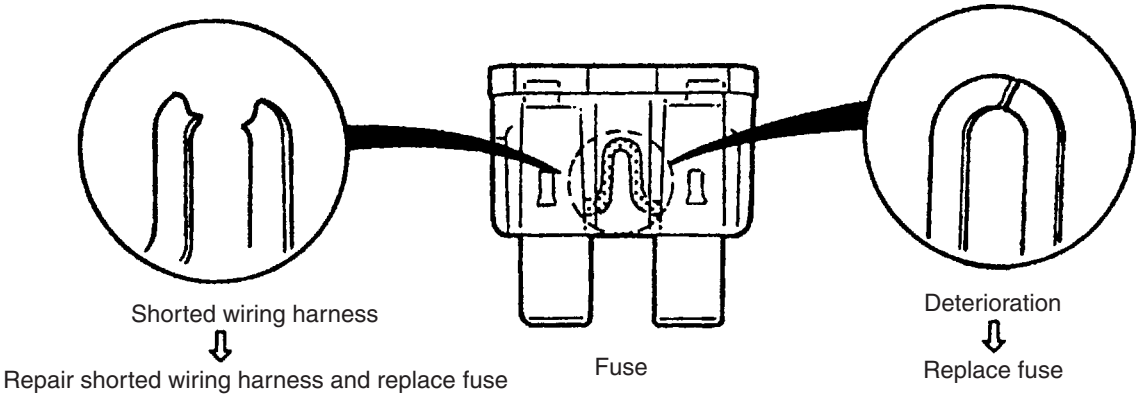
acxuuw00000316

## NO.1 MELTING OF MAIN OR OTHER FUSES[L3 WITH TC]

id010339800700

| 1 | MELTING OF MAIN OR OTHER FUSES |
|---|---|

**[TROUBLESHOOTING HINTS]**
Inspect condition of fuse.




| Damaged fuse | Related wiring harness |
|---|---|
| MAIN | **MAIN fuse**<br>• Starter<br>• Generator |
| IGN 1 | **IGN 1 fuse**<br>• Room fuse<br>• Ignition switch<br>— Starter relay<br>— Starter relay No.2<br>— PCM |
| IGN 2 | **IGN 2 fuse**<br>• Ignition switch<br>• Starter relay<br>— Engine fuse<br>— Meter fuse<br>— Starter |
| ENGINE (15A) | **ENGINE fuse (15A)**<br>• Fuel pump speed control relay<br>• Fuel pump relay<br>• Injector relay<br>• Ignition coil<br>— PCM |
| ENGINE (30A) | **ENGINE fuse (30A)**<br>• Main relay |
| FAN 1 | **FAN 1 fuse**<br>• Cooling fan relay No.1<br>— Fan control module main |
| FAN 2 | **FAN 2 fuse**<br>• Cooling fan relay No.2<br>— PCM<br>— Fan control module sub |
| FUEL | **FUEL fuse**<br>• Fuel pump resistor<br>• Fuel pump speed control relay<br>— Fuel pump relay<br>— Fuel pump unit |
| METER | **METER fuse**<br>• Starter relay No.2<br>— TCM |
| ROOM | **ROOM fuse**<br>• DLC-2 |
| INJ | **INJ fuse**<br>• Injector relay<br>— PCM |

| Damaged fuse | Related wiring harness |
|---|---|
| ETC | **ETC fuse**<br>• PCM<br>• Drive-by-wire relay |
| ECM | **ECM fuse**<br>• PCM<br>• Drive-by-wire relay<br>• Cooling fan relay No.1<br>• Cooling fan relay No.2 |
| ENG BAR 1 | **ENG BAR 1 fuse**<br>• Evapo system leak detection pump<br>• Mass air flow sensor<br>• Purge solenoid<br>• Waste gate control valve<br>• Variable swirl solenoid valve<br>• Camshaft position sensor<br>• Crankshaft position sensor<br>• PCM<br>• Oil control valve<br>• EGR valve |
| ENG BAR 2 | **ENG BAR 2 fuse**<br>• HO2S (front) |
| ENG BAR 3 | **ENG BAR 3 fuse**<br>• HO2S (rear)<br>— PCM |

### NO.2 MIL ILLUMINATES[L3 WITH TC]

id010339800800

| 2 | MIL ILLUMINATES |
|---|---|
| **DESCRIPTION** | MIL illuminates incorrectly. |
| **POSSIBLE CAUSE** | • PCM illuminates for emission-related concern (DTC is stored in PCM)<br>• Instrument cluster malfunction<br><br>**Note**<br>• If the MIL blinks at a steady rate, a misfire condition could possibly exist. |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>• Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>• Inspect for an open or short to circuit between instrument cluster terminal 2T and PCM terminal 1AI<br>• Inspect for an open or short to circuit between instrument cluster terminal 2R and PCM terminal 1AM<br>(See09-22-3 INSTRUMENT CLUSTER INSPECTION.) |
| 2 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.3 WILL NOT CRANK[L3 WITH TC]

id010339800900

| 3 | WILL NOT CRANK |
|---|---|
| DESCRIPTION | Starter does not work. |
| POSSIBLE CAUSE | • Open starter circuit between the ignition switch and the starter<br>• Low or dead battery<br>• Charging system malfunction<br>• Starter malfunction<br>• TR switch misadjustment<br>• P/N position switch in TR switch open<br>• Seized/hydro-locked engine, flywheel<br>• Immobilizer system and/or related circuit malfunction<br>• Immobilizer system operates properly (Key is not registered.)<br>• Advanced keyless entry system malfunction |



### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | **Note**<br>• The following test should be performed on the advanced keyless entry system. If not equipped, go to the next step.<br><br>Start the engine using the standard ignition key.<br>Does the engine start? | Yes | Inspect the advanced keyless entry system and repair or replace according to the inspection result. |
| | | No | Go to the next step. |
| 2 | Connect the M-MDS to the DLC-2.<br>Do any of the following conditions appear?<br>• Engine does not complete start.<br>• DTC B1681 is displayed. | Yes | **Both conditions are appear:**<br>Go to Step 6. |
| | | No | **Either or other condition appears:**<br>Go to the next step. |
| 3 | Is the coil connector securely connected to the coil? | Yes | Go to the next step. |
| | | No | Connect the connector securely, retest from Step 2. |
| 4 | Does the security light illuminate? | Yes | Go to the next step. |
| | | No | Inspect and repair or replace the following:<br>• Instrument cluster (See09-22-3 INSTRUMENT CLUSTER INSPECTION.)<br>**With advanced keyless entry system**<br>• Between keyless CM 3X and instrument cluster 2R<br>• Between keyless CM 3W and instrument cluster 2T<br>**Without advanced keyless entry system**<br>• Between PCM 1AM and instrument cluster 2R<br>• Between PCM 1AI and instrument cluster 2T |
| 5 | Retrieve DTCs using the M-MDS. Are any of the following DTCs present?<br>**DTC B1213, B1342, B1600, B1601, B1602, B1681, B2103, B2431** | Yes | Go to the appropriate DTC test.<br>(See09-02B-3 DTC TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].) |
| | | No | Advanced keyless entry system is not equipped:<br>Go to the next step.<br>Advanced keyless entry system is equipped:<br>Go to Step 11. |
| 6 | Is there continuity between PCM terminal 1BD, 1AZ, 1BH and ground? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 7 | Turn the ignition switch to the ON position (Engine off.)<br>Measure voltage between PCM terminal 1BD, 1AZ, 1BH and ground.<br>Is the voltage **below 1.0V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 8 | Turn the ignition switch to the ON position. (Engine off)<br>Access the VPWR PID.<br>Is the VPWR PID normal?<br>**VPWR PID**<br>**Battery voltage** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 9 | Disconnect the coil connector.<br>Turn the ignition switch to the ON position. (Engine off)<br>Is there battery voltage at coil connector terminal D? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness between coil connector terminal D and the fuse panel. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 10 | Inspect the following wiring harness and connectors.<br>**With advanced keyless entry system**<br>• Between coil terminal A and keyless CM terminal 3U<br>• Between coil terminal B and keyless CM terminal 3V<br>**Without advanced keyless entry system**<br>• Between coil terminal A and instrument cluster 2Q<br>• Between coil terminal B and instrument cluster 2S<br>Is there any malfunction (open or short circuit, terminal corrosion, etc.)? | Yes | Repair or replace malfunctioning part. |
| | | No | **With advanced keyless entry system**<br>Go to the next step.<br>**Without advanced keyless entry system**<br>Go to Step 14. |
| 11 | Is there continuity between the keyless CM harness-side connector terminal 2B and body ground? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 12 | Turn the ignition switch to the ON position.<br>Measure the voltage between keyless CM harness-side connector terminal 2B and body ground.<br>Is the voltage **below 1.0V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 13 | Turn the ignition switch to the ON position. (Engine off.)<br>Measure the voltage between keyless CM harness-side connector terminal 2A, 2C, 2D and body ground.<br>Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 14 | Inspect the following wiring harnesses and connectors.<br>• Between keyless CM terminal 3W and PCM 1AI<br>• Between keyless CM terminal 3X and PCM 1AM<br>Is there any malfunction (open or short circuit, terminal corrosion, etc.)? | Yes | Repair or replace malfunctioning part. |
| | | No | Go to the next step. |
| 15 | Turn the ignition switch off.<br>Disconnect the coil connector.<br>Turn the ignition switch to the ON position. (Engine off.)<br>Measure the voltage between coil harness-side connector terminal D and body ground.<br>Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 16 | Is there continuity between PCM terminal 1B and the starter relay with P or N position? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 17 | Inspect the following:<br>• Battery connection<br>• Battery condition<br>• Fuses<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1. |
| 18 | Is a clicking sound heard from the starter when the ignition switch is turned to the START position? | Yes | Go to the next step. |
| | | No | Go to Step 20. |
| 19 | Inspect the starting system.<br>(See01-19-3 STARTER INSPECTION[L3 WITH TC].)<br>Is the starting system normal? | Yes | Inspect for a seized/hydro-locked engine, flywheel. |
| | | No | Repair or replace components if necessary required. |
| 20 | Do any other electrical accessories work? | Yes | Go to the next step. |
| | | No | Inspect the charging system.<br>(See01-17-2 BATTERY INSPECTION[L3 WITH TC].)<br>(See01-17-6 GENERATOR INSPECTION[L3 WITH TC].) |
| 21 | Inspect adjustment of TR switch.<br>(See05-17-11 TRANSAXLE RANGE (TR) SWITCH INSPECTION[AW6A-EL, AW6AX-EL].)<br>Is TR switch adjusted properly? | Yes | Go to the next step. |
| | | No | Perform N position leaning.<br>If problem remains replace TR switch.<br>(See05-17-11 TRANSAXLE RANGE (TR) SWITCH INSPECTION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 22 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Inspect the following:<br>• START circuit in the ignition switch<br>• Open circuit between ignition switch and starter<br>• Starter interlock switch |
| 23 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.4 HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK[L3 WITH TC]

id010339801000

| 4 | HARD TO START/LONG CRANK/ERRATIC START/ERRATIC CRANK |
|---|---|
| **DESCRIPTION** | • Starter cranks the engine at normal speed but the engine requires excessive cranking time before starting.<br>• Battery is operating normally |
| **POSSIBLE CAUSE** | • Vacuum leakage<br>• Poor fuel quality<br>• Starting system malfunction<br>• Erratic signal to ignition coils<br>• Spark plug malfunction<br>• Air leakage from intake-air system<br>• Improper air/fuel mixture ratio control<br>• Incorrect fuel injection timing<br>• Erratic signal from CKP sensor<br>• Erratic signal from CMP sensor<br>• Front and/rear HO2S sensor or related circuit malfunction<br>• ECT sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• Intake-air system restriction<br>• Improper operation of electronic throttle control system<br>• PCV valve malfunction<br>• Inadequate fuel pressure (high or low pressure side)<br>• Relief valve malfunction (built-in delivery pipe)<br>• Spill valve control solenoid valve malfunction (built-in high pressure fuel pump)<br>• Fuel filter clogging<br>• Fuel line restriction<br>• Fuel leakage<br>• Fuel pump (low-side) resister or related circuit malfunction<br>• Fuel injector malfunction<br>• Fuel pressure sensor malfunction<br>• High pressure fuel pump malfunction<br>• Exhaust system or three-way catalytic converter restriction<br>• EGR valve malfunction<br>• Purge solenoid valve malfunction<br>• Low engine compression<br>• Improper valve timing<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>**• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>**• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>**• Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect for the following:<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Fuel leakage<br>• Intake-air system leakage or restriction<br>• Vacuum leakage<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1. |
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 3 | Access the ECT PID using the M-MDS.<br>Verify that the ECT PID is**less than 116°C {241°F}** during driving.<br>Is the ECT PID less than specified? | Yes | Go to the next step. |
| | | No | The cause of this concern could be from the cooling system overheating.<br>Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.”<br>(See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| 4 | Will the engine run smoothly at part throttle? | Yes | Go to the next step. |
| | | No | Go to Step 6. |
| 5 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damage/scratching.)<br>If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 6 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 7 | Perform the Purge Control System Operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the purge solenoid valve work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Inspect the CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses.<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |
| 9 | Access and monitor following the PIDs using the data monitor function.<br>• ECT<br>• MAF<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Do the PIDs indicate the correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 10 | Remove and shake the PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 11 | Inspect for restriction in the exhaust system and the three-way catalytic converter (TWC).<br>Is there any restriction? | Yes | Replace the malfunctioning part. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 12 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 13 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 38. |
| | | No | Go to the next step. |
| 14 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 16. |
| 15 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 17. |
| | | No | Replace the delivery pipe. |
| 16 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 21. |
| | | No | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) |
| 17 | Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump.<br>Measure the fuel pressure line of the low pressure side.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. |
| 18 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are the fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 19 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Does the starting system work properly? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 20 | Inspect the starting system.<br>(See01-19-3 STARTER INSPECTION[L3 WITH TC].)<br>Does the starting system work properly? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Repair or replace the malfunctioning part. |
| 21 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.5 ENGINE STALLS-AFTER START/AT IDLE[L3 WITH TC]

id010339801100

| 5 | ENGINE STALLS - AFTER START/AT IDLE |
|---|---|
| DESCRIPTION | • Engine stops unexpectedly. |
| POSSIBLE CAUSE | • A/C system improper operation<br>• Air leakage from intake-air system<br>• Purge solenoid valve malfunction<br>• Improper operation of electronic throttle control system<br>• EGR valve malfunction<br>• Vacuum leakage<br>• Engine overheating<br>• Low engine compression<br>• Ignition system malfunction<br>• Poor fuel quality<br>• PCV valve malfunction<br>• Intake-air system restriction<br>• Exhaust system and/or three-way catalytic converter (TWC) restriction or clogging<br>• Electrical connector disconnection<br>• Open or short circuit in the fuel pump (low-side) body or related wiring harness<br>• Fuel pump resister or related circuit malfunction<br>• No battery power supply to PCM or poor ground<br>• Inadequate fuel pressure (high or low pressure side)<br>• Fuel pressure sensor or related circuit malfunction<br>• Spill valve control solenoid valve malfunction (built-in high pressure fuel pump)<br>• Relief valve malfunction (built-in delivery pipe)<br>• Fuel pump (low-side) body mechanical malfunction<br>• Fuel leakage<br>• Fuel line restriction<br>• Fuel filter clogging<br>• Incorrect fuel injection timing<br>• High pressure fuel pump malfunction<br>• Fuel injector malfunction<br>• Ignition coil malfunction<br>• Improper air/fuel mixture ratio control<br>• No signal from CKP sensor due to sensor, related wiring harness or wrong installation<br>• Erratic signal from CMP sensor<br>• Front and/or rear HO2S sensor or related circuit malfunction<br>• ECT sensor or related circuit malfunction<br>• Accelerator positions sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• Improper valve timing<br>• Improper operation variable valve timing control system<br>• Immobilizer system and/or circuit malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Do any of the following conditions appear?<br>• Engine does not start completely.<br>• DTC B1681 is displayed. | Yes | **Both conditions are appear:**<br>Go to Step 5. |
| | | No | **Either or other condition appears:**<br>Go to the next step. |
| 2 | Does the engine stall after **approx. 2s** from when it is started? | Yes | Go to the next step. |
| | | No | Is the immobilizer system is normal?<br>Go to Step 16. |
| 3 | Is the coil connector securely connected to coil? | Yes | Go to the next step. |
| | | No | Connect the connector securely, retest from Step 2. |
| 4 | Does the security light illuminate? | Yes | Go to the next step. |
| | | No | Inspect and repair or replace the following:<br>• Instrument cluster (See09-22-3 INSTRUMENT CLUSTER INSPECTION.)<br>**With advanced keyless entry system**<br>• Between keyless CM 3X and instrument cluster 2R<br>• Between keyless CM 3W and instrument cluster 2T<br>**Without advanced keyless entry system**<br>• Between PCM 1AM and instrument cluster 2R<br>• Between PCM 1AI and instrument cluster 2T |
| 5 | Retrieve the DTC using the M-MDS.<br>Are any of the following DTCs present?<br>**DTC B1213, B1342, B1600, B1601, B1602, B1681, B2103, B2431** | Yes | Go to appropriate DTC test.<br>(See09-02B-3 DTC TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]) |
| | | No | Go to the next step. |
| 6 | Is there continuity between PCM terminal 1BD, 1AZ, 1BH and ground? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 7 | Turn the ignition switch to the ON position (Engine off.)<br>Measure the voltage between PCM terminal 1BD, 1AZ, 1BH and ground.<br>Is the voltage **below 1.0V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 8 | Turn the ignition switch to the ON position. (Engine off)<br>Access the VPWR PID.<br>Is the VPWR PID normal?<br>**VPWR PID**<br>**Battery voltage** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 9 | Disconnect the coil connector.<br>Turn the ignition switch to the ON position. (Engine off)<br>Is there battery voltage at coil connector terminal D? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness between coil connector terminal D and the fuse panel. |
| 10 | Inspect the following wiring harness and connectors.<br>**With advanced keyless entry system**<br>• Between coil terminal A and keyless CM terminal 3U<br>• Between coil terminal B and keyless CM terminal 3V<br>**Without advanced keyless entry system**<br>• Between coil terminal A and instrument cluster 2Q<br>• Between coil terminal B and instrument cluster 2S<br>Is there any malfunction (open or short circuit, terminal corrosion, etc.)? | Yes | Repair or replace malfunction part. |
| | | No | **With advanced keyless entry system**<br>Go to the next step.<br>**Without advanced keyless entry system**<br>Go to Step 14. |
| 11 | Is there continuity between the keyless CM harness-side connector terminal 2B and body ground? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 12 | Turn the ignition switch to the ON position.<br>Measure the voltage between keyless CM harness-side connector terminal 2B and body ground.<br>Is the voltage **below 1.0V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 13 | Turn the ignition switch to the ON position. (Engine off.) Measure the voltage between keyless CM harness-side connector terminal 2A, 2C, 2D and body ground. Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 14 | Inspect the following wiring harnesses and connectors. • Between keyless CM terminal 3W and PCM 1AI • Between keyless CM terminal 3X and PCM 1AM Is there any malfunction (open or short circuit, terminal corrosion, etc.)? | Yes | Repair or replace malfunctioning part. |
| | | No | Go to the next step. |
| 15 | Turn the ignition switch off. Disconnect the coil connector. Turn the ignition switch to the ON position. (Engine off.) Measure the voltage between coil harness-side connector terminal D and body ground. Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 16 | Inspect for the following: • Fuel quality (proper octane, contamination, winter/summer blend) • Intake-air system leakage and restriction • Electrical connectors • Poor connection for PCM ground and body ground • Fuel leakage • Vacuum leakage Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary. Repeat Step 16. |
| 17 | Perform the self-test function using M-MDS. Turn the ignition switch to the ON position. Retrieve any DTCs. Is the DTC displayed? | Yes | DTC is displayed: Go to the appropriate DTC test. (See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | No DTC is displayed: Go to the next step. |
| 18 | Access the ECT PID using the M-MDS. Verify that the ECT PID is **less than 116 °C {241 °F}** during driving. Is the ECT PID less than specified? | Yes | Go to the next step. |
| | | No | The cause of this concern could from be cooling system overheating. Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.” (See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| 19 | Access the VPWR PID. Turn the ignition switch to the ON position. (Engine off) Does the VPWR PID indicate**B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness between main relay terminal D and PCM terminal 1BE and 2E. |
| 20 | Perform the A/C Cut-off Operation Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the A/C Cut-off Operation work properly? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning parts according to the inspection results. |
| 21 | Will the engine run smoothly at part throttle? | Yes | Go to the next step. |
| | | No | Go to Step 23. |
| 22 | Perform the TP sweep inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 23 | Perform the EGR system operation inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 24 | Perform the Purge Control System Operation inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the purge solenoid valve work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 25 | Perform the Variable Valve Timing Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable valve timing control system work properly? | Yes | Inspect the valve timing. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 26 | Inspect the CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according inspection results. |
| | | No | Go to the next step. |
| 27 | Access and monitor the following PIDs using the data monitor function.<br>• ECT<br>• APP<br>• MAF<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Do the PIDs indicate the correct values under the malfunction condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 28 | Remove and shake the PCV valve. Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 29 | Inspect for restriction in the exhaust system and Three-way catalytic converter (TWC).<br>Is there any restriction? | Yes | Replace malfunctioning part. |
| | | No | Go to the next step. |
| 30 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 31 | Access and monitor the FUEL_PRES PID. Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 35. |
| | | No | Go to the next step. |
| 32 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 34. |
| 33 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 35. |
| | | No | Replace the delivery pipe. |
| 34 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 38. |
| | | No | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) |
| 35 | Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump.<br>Measure the fuel pressure line of the low pressure side.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>Is the fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal, replace the fuel pump. |
| 36 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are the fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 37 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are the compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 38 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.6 CRANKS NORMALLY BUT WILL NOT START[L3 WITH TC]

id010339801200

| 6 | CRANKS NORMALLY BUT NOT START |
|---|---|
| DESCRIPTION | • Starter cranks engine at normal speed but engine will not run.<br>• Refer to symptom troubleshooting “No.5 Engine stalls” if this symptom appears after the engine stalls.<br>• Fuel is in tank.<br>• Battery is in normal condition. |
| POSSIBLE CAUSE | • Air leakage from intake-air system<br>• Open PCM ground or vehicle body ground<br>• Improper operation of electronic throttle control system<br>• EGR valve malfunction<br>• Low engine compression<br>• Engine overheating<br>• Vacuum leakage<br>• Ignition system malfunction<br>• Poor fuel quality<br>• PCV valve malfunction<br>• Intake-air system restriction<br>• Improper air/fuel mixture ratio control<br>• No signal from CKP sensor due to sensor, related wire or incorrect installation<br>• No signal from CMP sensor due to sensor, related wire or incorrect installation<br>• Front and/or rear HO2S sensor or related circuit malfunction<br>• ECT sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• High pressure fuel pump malfunction<br>• Exhaust system or three-way catalytic converter (TWC) malfunction<br>• Disconnected electrical connector<br>• Open or short in fuel pump (low-side) body and related harness<br>• Inadequate fuel pressure (high or low pressure side)<br>• Fuel pressure sensor or related circuit malfunction<br>• Relief valve malfunction (built-in high pressure fuel pump)<br>• Fuel line clogging or restriction<br>• Incorrect fuel injection timing<br>• Fuel pump resistor or control relay malfunction<br>• Fuel pump (low-side) mechanical malfunction<br>• Fuel leakage<br>• Fuel injector malfunction<br>• Purge solenoid valve malfunction<br>• Spark plug malfunction<br>• Ignition coil malfunction<br>• Improper valve timing<br>• Improper variable valve timing control system operation<br>• Immobilizer system or related circuit malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR ROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Do any of the following conditions appear?<br>• Engine does not completely start.<br>• DTC B1681 is displayed. | Yes | **Both conditions are appear:**<br>Go to Step 5. |
| | | No | **Either or other condition appears:**<br>Go to the next step. |
| 2 | Does the engine stall after **approx. 2s** from when it is started? | Yes | Go to the next step. |
| | | No | Is the Is the immobilizer system is normal.<br>Go to Step 20. |
| 3 | Is the coil connector securely connected to coil? | Yes | Go to the next step. |
| | | No | Connect the connector securely, retest from Step 1. |
| 4 | Does the security light illuminate? | Yes | Go to the next step. |
| | | No | Inspect and repair or replace the following:<br>• Instrument cluster (See09-22-3 INSTRUMENT CLUSTER INSPECTION.)<br>**With advanced keyless entry system**<br>• Between keyless CM 3X and instrument cluster 2R<br>• Between keyless CM 3W and instrument cluster 2T<br>**Without advanced keyless entry system**<br>• Between PCM 1AM and instrument cluster 2R<br>• Between PCM 1AI and instrument cluster 2T |
| 5 | Retrieve the DTC using the M-MDS.<br>Are any of the following DTCs present?<br>**DTC**<br>**B1213, B1342, B1600, B1601, B1602, B1681, B2103, B2431** | Yes | Go to appropriate DTC test.<br>(See09-02B-3 DTC TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].) |
| | | No | Go to the next step. |
| 6 | Is there continuity between PCM terminal 1BD, 1AZ, 1BH and ground? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 7 | Turn the ignition switch to the ON position (Engine off.)<br>Measure the voltage between PCM terminal 1BD, 1AZ, 1BH and ground.<br>Is the voltage **below 1.0V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 8 | Turn the ignition switch to the ON position. (Engine off)<br>Access the VPWR PID.<br>Is the VPWR PID normal?<br>**VPWR PID**<br>**Battery voltage** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 9 | Disconnect the coil connector.<br>Turn the ignition switch to the ON position. (Engine off)<br>Is there battery voltage at coil connector terminal D? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness between coil connector terminal D and the fuse panel. |
| 10 | Inspect the following wiring harness and connectors.<br>**With advanced keyless entry system**<br>• Between coil terminal A and keyless CM terminal 3U<br>• Between coil terminal B and keyless CM terminal 3V<br>**Without advanced keyless entry system**<br>• Between coil terminal A and instrument cluster 2Q<br>• Between coil terminal B and instrument cluster 2S<br>Is there any malfunction (open or short circuit, terminal corrosion, etc.)? | Yes | Repair or replace malfunctioning part. |
| | | No | **With advanced keyless entry system**<br>Go to the next step.<br>**Without advanced keyless entry system**<br>Go to Step 14. |
| 11 | Is there continuity between the keyless CM harness-side connector terminal 2B and body ground? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 12 | Turn the ignition switch to the ON position.<br>Measure the voltage between keyless CM harness-side connector terminal 2B and body ground.<br>Is the voltage **below 1.0V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 13 | Turn the ignition switch to the ON position. (Engine off.)<br>Measure the voltage between keyless CM harness-side connector terminal 2A, 2C, 2D and body ground.<br>Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 14 | Inspect the following wiring harnesses and connectors.<br>• Between keyless CM terminal 3W and PCM 1AI<br>• Between keyless CM terminal 3X and PCM 1AM<br>Is there any malfunction (open or short circuit, terminal corrosion, etc.)? | Yes | Repair or replace malfunctioning part. |
| | | No | Go to the next step. |
| 15 | Turn the ignition switch off.<br>Disconnect the coil connector.<br>Turn the ignition switch to the ON position. (Engine off.)<br>Measure the voltage between coil harness-side connector terminal D and body ground.<br>Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 16 | Inspect for the following:<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Intake-air system leakage and restriction<br>• Electrical connectors<br>• Fuses<br>• Fuel leakage<br>• Vacuum leakage<br>• Poor connection for PCM ground and body ground<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 16. |
| 17 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | DTC is displayed:<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | No DTC is displayed:<br>Go to the next step. |
| 18 | Access the ECT PID using the M-MDS.<br>Verify that the ECT PID is **less than 116°C {241°F}** during driving.<br>Is the ECT PID less than specified? | Yes | Go to the next step. |
| | | No | The cause of this concern could be from the cooling system overheating.<br>Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.”<br>(See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| 19 | Does the engine start with throttle close? | Yes | Go to the next step. |
| | | No | Go to Step 25. |
| 20 | Perform the Variable Valve Timing Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable valve timing control system work properly? | Yes | Inspect the valve timing. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 21 | Will the engine start and run smoothly at part throttle? | Yes | Go to the next step. |
| | | No | Go to Step 23. |
| 22 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.)<br>If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according the to inspection results. |
| 23 | Access the RPM PID using the M-MDS.<br>Is the RPM PID indicating engine speed when the cranking engine. | Yes | Go to the next step. |
| | | No | Inspect the CKP sensor for following;<br>• Installation condition (See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in wiring harnesses Is there any malfunction detected? |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 24 | Inspect CMP sensor for the following;<br>• Installation condition (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in wiring harnesses Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according inspection results. |
| | | No | Go to the next step. |
| 25 | Perform the EGR system operation inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 26 | Perform the Purge Control System Operation inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the purge solenoid valve work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 27 | Access and monitor the following PIDs using the data monitor function.<br>• ECT<br>• APP<br>• MAF<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Do the PIDs indicate the correct values under the malfunction condition? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses. If the malfunction remains, perform the intermittent concern troubleshooting procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 28 | Inspect for restriction in the exhaust system and three-way catalytic converter (TWC). Is there any restriction? | Yes | Replace malfunctioning part. |
| | | No | Go to the next step. |
| 29 | Remove and shake the PCV valve. Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 30 | Perform the spark test. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 31 | Access and monitor the FUEL_PRES PID. Is the FUEL_PRES PID value within the specification? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 38. |
| | | No | Go to the next step. |
| 32 | Replace the high pressure fuel pump. MOnitor FUEL_PRES PID. Is the FUEL_PRES PID value within the specified? (See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed. Go to Step 37. |
| | | No | Go to the next step. |
| 33 | Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the delivery pipe. |
| 34 | Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump. Measure the fuel pressure line of the low pressure side. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) Is the fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal, replace the fuel pump. |
| 35 | Inspect the fuel injector for each cylinder. (See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].) Are the fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 36 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are the compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 37 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.7 SLOW RETURN TO IDLE[L3 WITH TC]

id010339801300

| 7 | SLOW RETURN TO IDLE |
|---|---|
| DESCRIPTION | • Engine takes more time than normal to return to idle speed.<br>• Engine speed continues at fast idle after warm-up |
| POSSIBLE CAUSE | • ECT sensor or related circuit malfunction<br>• Thermostat is stuck open<br>• Fuel injection timing is incorrect<br>• Erratic signal from CKP sensor<br>• Erratic signal from CMP sensor<br>• Accelerator position sensor or related circuit malfunction<br>• Air suction in intake-air system<br>• MAF sensor or related circuit malfunction<br>• Fuel pressure sensor or related circuit malfunction<br>• Excessive fuel pressure<br>• Relief valve malfunction (built-in delivery pipe)<br>• Fuel injector malfunction<br>• Cooling fan control system malfunction<br>• Improper load signal input<br>• Injector driver module or related circuit malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect air suction in intake-air system components while racing engine to higher speed.<br>Is any air suction? | Yes | Repair or replace as necessary. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 3 | Access the ECT PID.<br>Start and warm-up engine to normal operating temperature.<br>Is the ECT PID reading**below 82°C {180°F}**? | Yes | Go to the next step. |
| | | No | Go to symptom troubleshooting “NO.18 COOLING SYSTEM CONCERNS, RUNS COLD”.<br>(See01-03-61 NO.18 COOLING SYSTEM CONCERNS-RUNS COLD[L3 WITH TC].) |
| 4 | Verify the cooling fan operation. Does the cooling fan operate properly according ECT PID value? | Yes | Go to the next step. |
| | | No | Perform the Cooling Fan Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) |
| 5 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses.<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according inspection results. |
| | | No | Go to the next step. |
| 6 | Access and monitor following the PIDs using the data monitor function.<br>• ECT<br>• APP<br>• MAF<br>• PSP (PCM terminal 2T)<br>Do the PIDs indicate the correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 7 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 11. |
| | | No | Go to the next step. |
| 8 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 10. |
| 9 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 11. |
| | | No | Replace the delivery pipe. |
| 10 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 13. |
| | | No | Go to the next step. |
| 11 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 12 | Remove the thermostat and inspection operation.<br>(See01-12-11 THERMOSTAT REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-12-11 THERMOSTAT INSPECTION[L3 WITH TC].)<br>Is the thermostat normal? | Yes | Inspect and repair or replace the throttle body.<br>If throttle body is normal or the problem remains, replace the injector driver module. |
| | | No | Replace thermostat. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 13 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

### NO.8 ENGINE RUNS ROUGH/ROLLING IDLE[L3 WITH TC]

id010339801400

| 8 | ENGINE RUNS ROUGH/ROLLING IDLE |
|---|---|
| DESCRIPTION | • Engine speed fluctuates between the specified idle speed and lower speed and, engine shakes excessively.<br>• Idle speed is too slow and the engine shakes excessively. |
| POSSIBLE CAUSE | • Air leakage from intake-air system<br>• A/C system improper operation<br>• Erratic signal to ignition coil<br>• Spark plug malfunction<br>• Purge solenoid valve malfunction<br>• Improper operation of electronic throttle control system<br>• EGR valve malfunction<br>• Low engine compression or excessive unbalance for each cylinder<br>• Improper valve timing<br>• Improper variable valve timing control system<br>• Poor fuel quality<br>• PCV valve malfunction<br>• Intake-air system restriction<br>• Exhaust system or three-way catalytic converter (TWC) restriction or clogging<br>• Disconnected electrical connectors<br>• Inadequate fuel pressure (high or low pressure side)<br>• Fuel pressure sensor or related circuit malfunction<br>• Spill valve control solenoid valve malfunction (built-in high pressure fuel pump)<br>• Relief valve malfunction (built-in delivery pipe)<br>• Fuel pump (low-side) body mechanical malfunction<br>• Fuel filter restriction or clogging<br>• Fuel leakage<br>• Incorrect fuel injection timing<br>• Unbalanced fuel injection amount for each cylinder<br>• High pressure fuel pump malfunction<br>• Fuel injector malfunction<br>• Erratic signal from CKP sensor<br>• Erratic or no signal from CMP sensor<br>• ECT sensor or related circuit malfunction<br>• Manifold absolute pressure (MAP) sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• MAF sensor malfunction<br>• Incorrect or no load signal input<br>• Engine overheating<br>• Vacuum leakage<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect for the following:<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Intake-air system restriction or leakage<br>• Electrical connectors connection<br>• Fuel leakage in fuel system<br>• Vacuum leakage<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1. |
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 3 | Access the ECT PID.<br>Verify that the ECT PID is**less than 116°C {241°F}** during driving.<br>Is the ECT PID less than specified? | Yes | Go to the next step. |
| | | No | The cause of this concern could be from the cooling system overheating.<br>Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.”<br>(See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| 4 | Perform the A/C Cut-off Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the A/C Cut-off Operation work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts according to inspection results. |
| 5 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 6 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according the to inspection results. |
| 7 | Perform the Purge Control System Operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the purge solenoid valve work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Perform the Variable Valve Timing Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 9 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses.<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 10 | Connect the M-MDS to the DLC-2.<br>Access and monitor following PIDs using the data monitor function.<br>• ACSW<br>• APP<br>• ECT<br>• MAF<br>• MAP<br>• PSP (PCM terminal 2T)<br>Do the PIDs indicate the correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 11 | Inspect for restriction in the exhaust system and three-way catalytic converter (TWC).<br>Is there any restriction? | Yes | Replace the malfunctioning part. |
| | | No | Go to the next step. |
| 12 | Remove and shake the PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 13 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 14 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 18. |
| | | No | Go to the next step. |
| 15 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 17. |
| 16 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 18. |
| | | No | Replace the delivery pipe. |
| 17 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 21. |
| | | No | Go to the next step. |
| 18 | Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump.<br>Measure the fuel pressure line of the low pressure side.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>Is the fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. |
| 19 | Inspect fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are the fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 20 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 21 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.9 FAST IDLE/RUNS ON[L3 WITH TC]

id010339801500

| 9 | FAST IDLE/RUNS ON |
|---|---|
| DESCRIPTION | • Engine speed continues at fast idle after warm-up.<br>• Engine runs after the ignition switch is turned off. |
| POSSIBLE CAUSE | • ECT sensor or related circuit malfunction<br>• Suction control valve (built-in high pressure fuel pump)<br>• Fuel injector malfunction<br>• Air leakage from intake-air system<br>• Throttle body malfunction<br>• Accelerator pedal position sensor or related circuit malfunction<br>• Cruise control system operation improperly<br>• Improper load signal input<br>• Improper operation of electric throttle control system<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC.<br>Access the ECT PID.<br>Start and warm-up engine to normal operating temperature.<br>Is ECT PID reading between**82— 112 °C {180— 234 °F}**? | Yes | Go to the next step. |
| | | No | **ECT PID is higher than 112 °C {234 °F}:**<br>Go to symptom troubleshooting "NO.17 COOLING SYSTEM CONCERNS - OVERHEATING".<br>**ECT PID is less than 82 °C {180 °F}**<br>Go to symptom troubleshooting "NO.18 COOLING SYSTEM CONCERNS - RUNS COLD". |
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 3 | Inspect for leakage in intake-air system.<br>Is there any leakage found? | Yes | Repair or replace for leakage. |
| | | No | Go to the next step. |
| 4 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 5 | Connect the M-MDS to the DLC-2.<br>Access and monitor the following PIDs using the data monitor function.<br>• ECT<br>• APP<br>• ACSW<br>• PSP (PCM terminal 2T)<br>Do the PIDs indicate the correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 6 | Inspect the high pressure fuel pump.<br>(See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>Is the high pressure fuel pump normal? | Yes | Go to the next step. |
| | | No | Replace the high pressure fuel pump. |
| 7 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 8 | Inspect the operation of cruise control system.<br>Does the cruise control system work properly? | Yes | Inspect and repair or replace the injector driver module or related circuit. |
| | | No | Repair or replace the malfunctioning part according to inspection results. |
| 9 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.10 LOW IDLE/STALLS DURING DECELERATION[L3 WITH TC]

id010339801600

| 10 | LOW IDLE/STALLS DURING DECELERATION |
|---|---|
| DESCRIPTION | • Engine stops unexpectedly at beginning of deceleration or recovery from deceleration. |
| POSSIBLE CAUSE | • Poor fuel quality<br>• Vacuum leakage<br>• Improper operation of electronic throttle control system<br>• Air leakage from intake-air system<br>• Intake-air system restriction<br>• EVAP control system malfunction<br>• Improper air/fuel mixture ratio control<br>• Erratic signal from CKP sensor<br>• Erratic signal from CMP sensor<br>• Accelerator position sensor or related circuit malfunction<br>• TP sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• Front and/or rear HO2S sensor or related circuit malfunction<br>• Brake switch or related circuit malfunction<br>• TR switch or related circuit malfunction<br>• Improper A/C magnetic clutch operation<br>• Inadequate fuel pressure (high or low pressure side)<br>• Suction control valve malfunction (built-in high pressure fuel pump)<br>• Relief valve malfunction (built-in delivery pipe)<br>• Fuel leakage<br>• Fuel line restriction<br>• Fuel filter clogging<br>• Incorrect fuel injection timing<br>• High pressure fuel pump malfunction<br>• Fuel injector malfunction<br>• Low engine compression<br>• Improper valve timing<br>• EGR system malfunction<br>• Vacuum leakage<br>• ECT sensor or related circuit malfunction<br>• Fuel pressure sensor or related circuit malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>**• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>**• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>**• Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Does the engine idle rough? | Yes | Go to symptom troubleshooting "NO.8 ENGINE RUNS ROUGH/ROLLING IDLE".<br>(See01-03-34 NO.8 ENGINE RUNS ROUGH/ ROLLING IDLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 2 | Verify the following:<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Intake-air system restriction or leakage<br>• Fuel leakage in fuel system<br>• Vacuum leakage<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary. Repeat Step 2. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 3 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according inspection results. |
| | | No | Go to the next step. |
| 4 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 5 | Connect the M-MDS to the DLC-2.<br>Access and monitor the following PIDs using the data monitor function.<br>• ACSW<br>• APP<br>• BOO<br>• ECT<br>• MAF<br>• TP<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>• PSP (PCM terminal 2T)<br>Do the PIDs indicate the correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 6 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 7 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Perform the Purge Control System Operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the purge solenoid valve work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 9 | Perform the A/C Cut-off Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the A/C Cut-off Operation work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts according to inspection results. |
| 10 | Inspect adjustment of TR switch.<br>(See05-17-11 TRANSAXLE RANGE (TR) SWITCH INSPECTION[AW6A-EL, AW6AX-EL].)<br>Is TR switch adjusted properly? | Yes | Go to the next step. |
| | | No | Perform N position leaning.<br>(See .)<br>If problem remains replace TR switch.<br>(See05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 11 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 15. |
| | | No | Go to the next step. |
| 12 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 15. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 13 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 15. |
| | | No | Replace the delivery pipe. |
| 14 | Replace the high pressure fuel pump<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to the Step 18. |
| | | No | Go to the next step. |
| 15 | Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump.<br>Measure the fuel pressure line of the low pressure side.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>Is the fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. |
| 16 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 17 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 18 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

### NO.11 ENGINE STALLS/QUITS, ENGINE RUNS ROUGH, MISSES, BUCK/JERK, HESITATION/STUMBLE, SURGES[L3 WITH TC]

id010339801700

| | |
|---|---|
| **11** | **ENGINE STALLS/QUITS (ACCELERATION/CRUISE)**<br>**ENGINE RUNS ROUGH (ACCELERATION/CRUISE)**<br>**BUCK/JERK (ACCELERATION/CRUISE/DECELERATION)**<br>**HESITATION/STUMBLE (ACCELERATION)**<br>**SURGES (ACCELERATION/CRUISE)** |
| **DESCRIPTION** | • Engine stops unexpectedly at beginning of acceleration or during cruise.<br>• Engine stops unexpectedly while cruising.<br>• Engine speed fluctuates during acceleration or cruising.<br>• Engine misses during acceleration or cruising.<br>• Vehicle bucks/jerks during acceleration, during or deceleration.<br>• Momentary pause at beginning of acceleration or during acceleration<br>• Momentary minor irregularity in engine output |

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| 11 | **ENGINE STALLS/QUITS (ACCELERATION/CRUISE)**<br>**ENGINE RUNS ROUGH (ACCELERATION/CRUISE)**<br>**BUCK/JERK (ACCELERATION/CRUISE/DECELERATION)**<br>**HESITATION/STUMBLE (ACCELERATION)**<br>**SURGES (ACCELERATION/CRUISE)** |
| **POSSIBLE CAUSE** | • A/C system improper operation<br>• Air leakage from intake-air system<br>• Intake-air system restriction<br>• Purge solenoid valve malfunction<br>• Improper operation of electronic throttle control system<br>• EGR system malfunction<br>• Low engine compression<br>• Turbocharger malfunction<br>• Improper operation of wastegate control system<br>• Vacuum leakage<br>• Poor fuel quality<br>• Main relay intermittent malfunction<br>• Throttle body malfunction<br>• Engine overheating<br>• Spark plug malfunction<br>• Variable swirl system malfunction<br>• Air cleaner restriction<br>• PCV valve malfunction<br>• Improper valve timing due to jumping out timing chain<br>• Exhaust system and/or three-way catalytic converter restriction<br>• Intermittent open or short circuit in fuel pump circuit<br>• Incorrect fuel injection timing<br>• Inadequate fuel pressure (high or low pressure side)<br>• Fuel pressure sensor or related circuit malfunction<br>• Suction control valve malfunction (built-in high pressure fuel pump)<br>• Relief valve malfunction (built-in delivery pipe)<br>• High pressure fuel pump malfunction<br>• Fuel injector malfunction<br>• Improper fuel pump speed control operation<br>• Fuel pump mechanical malfunction<br>• Fuel line restriction or clogging<br>• Improper air/fuel mixture ratio control operation<br>• Erratic or no signal from CMP sensor<br>• Erratic signal from CKP sensor<br>• Front and/or rear HO2S sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• Neutral switch or related circuit malfunction<br>• ECT sensor or related circuit malfunction<br>• Manifold absolute pressure (MAP) sensor or related circuit malfunction<br>• IAT sensor No.1 or related circuit malfunction<br>• IAT sensor No.2 or related circuit malfunction<br>• Intermittent open or short circuit MAF sensor, accelerator position sensor, TP sensor and VSS<br>• ATX malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect for the following:<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Air leakage from intake-air system<br>• Intake-air system restriction<br>• Air cleaner element<br>• Clutch slippage<br>• Fuel leakage from fuel line<br>• Vacuum leakage<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1. |
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 3 | Access the ECT PID.<br>Verify that the ECT PID is**less than 116°C {241°F}** during driving.<br>Is the ECT PID less than specified? | Yes | Go to the next step. |
| | | No | The cause of this concern could be from the cooling system overheating.<br>Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.”<br>(See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| 4 | Perform the Main Relay Operation Inspection with wiggle the related harness.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the main relay operate properly? | Yes | Go to the next step. |
| | | No | Repair or replace for the intermittent fault. |
| 5 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |
| 6 | Connect the M-MDS to DLC-2.<br>Access and monitor following PIDs using the data monitor function while wiggle the harness and under trouble condition.<br>• APP<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• MAP<br>• FP<br>• VSS<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Do the PIDs indicate correct values?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the Step 13. |
| | | No | Inspect and repair or replace suspected parts and related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].)<br>If the MAP PID remains without specified, go to the next step. |
| 7 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Perform the A/C Cut-off Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the A/C Cut-off Operation work properly? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning parts, according to inspection results. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 9 | Perform the TP sweep inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 10 | Perform the Variable Swirl Control System Operation Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 11 | Perform the Purge Control System Operation Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the purge control system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 12 | Perform the Fuel Pump Speed Control Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the fuel pump speed control work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 13 | Perform the Wastegate Control System Operation Inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Does the wastegate control system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 14 | Remove the parts necessary to inspect turbocharger without removing the turbocharger. Inspect if turbocharger compressor wheel is bent, damaged, or interfering with housing on vehicle. (See01-13-17 TURBOCHARGER INSPECTION[L3 WITH TC].) Is there any problem? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 15 | Inspect the turbocharger compressor wheel locknut is loose or has fallen down inside turbocharger. Is there any problem? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 16 | Inspect turbocharger compressor wheel by hand. Does the wheel turn easily and smoothly? | Yes | Go to the next step. |
| | | No | Replace the turbocharger. |
| 17 | Inspect the turbocharger turbine wheel is damaged, cracked or interfering with housing on vehicle.<br><br>**Note**<br>• Inspect all fins on each turbine wheel.<br><br>Is there any problem? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 18 | Is any engine oil found inside turbocharger turbine housing? | Yes | **Excessive amount of oil is found:**<br>Replace the turbocharger.<br>**Small amount of oil is found:**<br>Wipe oil out of vehicle, then go to the next step. |
| | | No | Go to the next step. |
| 19 | Is any engine oil found inside turbocharger compressor housing? | Yes | Wipe oil out vehicle and install all removed parts in Step 14. Then, go to the next step. |
| | | No | Turbocharger is normal.<br>Install all parts removed in Step 14.<br>Then, go to the next step. |
| 20 | Inspect for restriction in the exhaust system and three-way catalytic converter (TWC). Is there any restriction? | Yes | Replace the malfunctioning part. |
| | | No | Go to the next step. |
| 21 | Remove and shake the PCV valve. Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 22 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 23 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 27. |
| | | No | Go to the next step. |
| 24 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step.26. |
| 25 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to the Step 27. |
| | | No | Replace the delivery pipe. |
| 26 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 30. |
| | | No | Go to the next step. |
| 27 | Connect the fuel pressure gauge between the fuel pump and the high pressure fuel pump.<br>Measure the fuel pressure line of the low pressure side.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>Is the fuel pressure with in the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. |
| 28 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 29 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 30 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.12 LACK/LOSS OF POWER (ACCELERATION/CRUISE)[L3 WITH TC]

id010339801800

| 12 | LACK/LOSS OF POWER (ACCELERATION/CRUISE) |
|---|---|
| DESCRIPTION | Performance is poor under load (e.g., powers down when climbing hills). |
| POSSIBLE CAUSE | • Improper A/C system operation<br>• Improper operation of A/C cut-off control<br>• Air leakage or restriction from intake-air system<br>• Loose turbocharger compressor-to-intake manifold duct connecting<br>• Turbocharger rotating assembly binding or dragging<br>• Wastegate valve malfunction (stuck open)<br>• Turbocharger malfunction<br>• Charge air cooler malfunction<br>• Variable swirl system malfunction<br>• Improper operation of electronic throttle control system<br>• Purge solenoid valve malfunction<br>• EGR system malfunction<br>• Brake dragging<br>• Low engine compression<br>• Poor fuel quality<br>• Vacuum leakage<br>• Incorrect signal to ignition coil<br>• Spark plug malfunction<br>• Engine overheating<br>• Throttle body malfunction<br>• Air cleaner restriction or dirty<br>• PCV valve malfunction<br>• Improper valve timing due to jumping out of timing chain<br>• Improper operation of variable valve timing control system<br>• Restriction in exhaust system or three-way catalytic converter (TWC)<br>• Leakage at exhaust manifold or turbocharger mounting flange<br>• Intermittent open or short fuel pump related circuit<br>• Inadequate fuel pressure (high-or low pressure side)<br>• Fuel pressure sensor or related circuit malfunction<br>• Suction control valve or related circuit malfunction (built-in high pressure fuel pump)<br>• Relief valve malfunction (built-in delivery pipe)<br>• High pressure fuel pump malfunction<br>• Improper fuel pump speed control operation<br>• Fuel pump mechanical malfunction<br>• Fuel line restriction or clogging<br>• Fuel injector malfunction<br>• Incorrect fuel injection timing<br>• Erratic signal from CKP sensor<br>• Erratic or no signal from CMP sensor<br>• ECT sensor or related circuit malfunction<br>• Manifold absolute pressure (MAP) sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• MAF/IAT sensor or related circuit malfunction<br>• IAT sensor No.2 or related circuit malfunction<br>• Intermittent open or short circuit MAF sensor, accelerator position sensor, TP sensor and VSS<br>• ATX malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Verify the following:<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Air cleaner restriction or dirty<br>• Intake-air system restriction or leakage<br>• Charge air cooler condition (restriction or damaged)<br>• Turbocharger compressor-to-intake manifold duct loose connection<br>• Leakage at exhaust manifold or turbocharger mounting flange<br>• Vacuum leakage<br>• Clutch slippage<br>• Brake dragging<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1. |
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 3 | Is the engine overheating? | Yes | Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERN-OVERHEATING.”<br>(See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 5 | Perform the A/C Cut-off Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the A/C Cut-off Operation work properly? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning parts, according to the inspection results. |
| 6 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Visually inspect throttle body (damaged/scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 7 | Perform the Variable Swirl Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Perform the Variable Valve Timing Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable valve timing control system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 9 | Perform the Purge Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the purge control system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 10 | Perform Fuel Pump Speed Control Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the fuel pump speed control work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 11 | Perform the Wastegate Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the wastegate control system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 12 | Connect the M-MDS to DLC-2.<br>Access and monitor following PIDs using the data monitor function.<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• APP<br>• TP<br>• MAP<br>• FP (Low side pressure line)<br>• VSS<br>Do the PIDs indicate correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 13 | Inspect CMP and CKP sensor for following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in wiring harnesses Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |
| 14 | Remove and shake PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 15 | Inspect spark plug condition.<br>Is spark plug wet, covered with carbon or grayish white? | Yes | Spark plug is wet or covered with carbon:<br>Perform the Spark Test and repair or replace malfunctioning part according to inspection result.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Spark plug is grayish white:<br>Go to Step 23. |
| | | No | Install spark plugs on original cylinders.<br>Go to the next step. |
| 16 | Inspect for restriction in exhaust system and three-way catalytic converter (TWC).<br>Is there any restriction? | Yes | Replace malfunctioning part. |
| | | No | Go to the next step. |
| 17 | Remove parts necessary to inspect turbocharger without removing the turbocharger.<br>Inspect if turbocharger compressor wheel is bent, damaged, or interfering with housing on vehicle.<br>(See01-13-17 TURBOCHARGER INSPECTION[L3 WITH TC].)<br>Is there any problem? | Yes | Replace turbocharger. |
| | | No | Go to the next step. |
| 18 | Inspect turbocharger compressor wheel locknut is loose or has fallen down inside turbocharger.<br>Is there any problem? | Yes | Replace turbocharger. |
| | | No | Go to the next step. |
| 19 | Inspect turbocharger compressor wheel by hand.<br>Does wheel turn easily and smoothly? | Yes | Go to the next step. |
| | | No | Replace turbocharger. |
| 20 | Inspect turbocharger turbine wheel is damaged, cracked or interfering with housing on vehicle.<br><br>**Note**<br>• Inspect all fins on each turbine wheel.<br><br>Is there any problem? | Yes | Replace turbocharger. |
| | | No | Go to the next step. |
| 21 | Is any engine oil found inside turbocharger turbine housing? | Yes | Excessive amount of oil is found:<br>Replace turbocharger.<br>Small amount of oil is found:<br>Wipe oil out of vehicle, then Go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 22 | Is any engine oil found inside turbocharger compressor housing? | Yes | Wipe oil out vehicle and install all removed parts in Step 16. Then, Go to the next step. |
| | | No | Turbocharger is normal.<br>Install all parts removed in Step 17.<br>Then, Go to the next step. |
| 23 | Inspect for leakage in fuel line.<br>Is there any fuel leakage found? | Yes | Repair or replace suspected part. |
| | | No | Go to the next step. |
| 24 | Access and monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 27. |
| | | No | Go to the next step. |
| 25 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 30. |
| | | No | Go to the next step. |
| 26 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the delivery pipe. |
| 27 | Connect the fuel pressure gauge between fuel pump and high pressure fuel pump.<br>Measure the fuel pressure line of the low pressure side.<br>(See01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)<br>Is the fuel pressure within the specification? | Yes | Go to the next step. |
| | | No | Inspect for the following:<br>• Fuel line restriction<br>• Fuel filter clogging<br>If normal replace the fuel pump. |
| 28 | Inspect fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 29 | Measure compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 30 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.13 KNOCKING/PINGING[L3 WITH TC]

id010339801900

| 13 | KNOCKING/PINGING |
|---|---|
| DESCRIPTION | Sound is produced when air/fuel mixture is ignited by something other than a spark plug (e.g., hot spot in the combustion chamber). |
| POSSIBLE CAUSE | • Poor fuel quality<br>• Engine overheating due to cooling system malfunction<br>• Variable swirl valve stuck closed<br>• Improper operation of electronic throttle system<br>• Air leakage or restriction from intake-air system<br>• ECT sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• IAT sensor No.1 or related circuit malfunction<br>• IAT sensor No.2 or related circuit malfunction<br>• Incorrect fuel injection timing or amount<br>• Fuel injector malfunction<br>• Knock sensor or related circuit malfunction<br>• Ignition system malfunction<br>• Erratic signal from CMP sensor<br>• Inadequate engine compression<br>• Inadequate fuel pressure (high-pressure side)<br>• Manifold absolute pressure (MAP) sensor or related malfunction<br>• Wastegate valve malfunction (stuck closed)<br>• Charge air cooler malfunction<br>• Fuel pressure sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• Suction control valve malfunction (built-in high pressure fuel pump)<br>• Exhaust system and/or three-way catalytic converter (TWC) restriction<br>• EGR system malfunction<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Access the ECT PID.<br>Verify that the ECT PID is less than 116°C {241°F} during driving.<br>Is ECT PID less than specified? | Yes | Go to the next step. |
| | | No | The cause of this concern could be from the cooling system overheating.<br>Perform the symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.” (See01-03-60 NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC].) |
| 2 | Inspect for the following:<br>• Air leakage or restriction from intake-air system<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Exhaust system and/or three-way catalytic converter (TWC) restriction<br>• Charge air cooler condition (restriction or damaged)<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 2. |
| 3 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 4 | Inspect the knock sensor.<br>(See01-40-47 KNOCK SENSOR (KS) INSPECTION[L3 WITH TC].)<br>Is the knock sensor normal? | Yes | Go to the next step. |
| | | No | Replace the knock sensor.<br>(See01-40-47 KNOCK SENSOR (KS) REMOVAL/ INSTALLATION[L3 WITH TC] |
| 5 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 6 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 7 | Perform the Variable Swirl Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Perform the Wastegate Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 9 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 10 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 11 | Connect the M-MDS to the DLC-2.<br>Access and monitor the following PIDs using the data monitor function.<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• APP<br>• TP<br>• MAP<br>Do the PIDs indicate correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 12 | Access and monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 16. |
| | | No | Go to the next step. |
| 13 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to the Step 15. |
| 14 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 16. |
| | | No | Replace the delivery pipe. |
| 15 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 17. |
| | | No | Go to the next step. |
| 16 | Measure compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressure within the specified? | Yes | Inspect fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].) |
| | | No | Inspect following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service as necessary. |
| 17 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.14 POOR FUEL ECONOMY[L3 WITH TC]

id010339802000

| 14 | POOR FUEL ECONOMY |
|---|---|
| DESCRIPTION | Fuel economy is unsatisfactory. |
| POSSIBLE CAUSE | • Contaminated air cleaner element<br>• Engine cooling system malfunction<br>• Improper ATF level<br>• Weak spark<br>• Spark plug malfunction<br>• Poor fuel quality<br>• Erratic signal from CKP sensor<br>• Erratic or no signal from CMP sensor<br>• Fuel pressure sensor or related circuit malfunction<br>• ECT sensor or related circuit malfunction<br>• Manifold absolute pressure (MAP) sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• Contaminated MAF sensor<br>• IAT sensor No.1 or related circuit malfunction<br>• IAT sensor No.2 or related circuit malfunction<br>• VSS or related circuit malfunction<br>• Variable swirl system malfunction<br>• Improper coolant level<br>• Inadequate fuel pressure (high-pressure side)<br>• Injection timing is incorrect<br>• Fuel injector or related circuit malfunction<br>• High pressure fuel pump malfunction<br>• Fuel leakage<br>• Fuel line restriction<br>• Fuel filter clogging<br>• PCV valve malfunction<br>• Brake dragging<br>• A/C system improper operation<br>• Improper valve timing due to jumping out of timing chain<br>• Improper engine compression<br>• Turbocharger malfunction<br>• Charge air cooler malfunction<br>• Exhaust system and/or three-way catalytic converter clogging<br>• EGR system malfunction<br>• Vacuum leakage<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect for the following:<br>• Air cleaner element for contamination<br>• Intake-air system restriction<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Coolant level<br>• ATF level<br>• Brake dragging<br>• Charge air cooler condition (restriction or damaged)<br>• Vacuum leakage<br>• Fuel leakage<br>• MAF sensor contaminated<br>• Exhaust system and/or three-way catalytic converter restriction<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1. |
| 2 | Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | DTC is displayed:<br>Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | No DTC is displayed:<br>Go to the next step. |
| 3 | Perform the Cooling Fan Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 4 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 5 | Perform the Variable Swirl Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 6 | Perform the Wastegate Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 7 | Perform the A/C Cut-off Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the A/C Cut-off Operation work properly? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning parts, according to the inspection results. |
| 8 | Remove and shake the PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 9 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is the strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 10 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 11 | Connect the M-MDS to the DLC-2.<br>Access and monitor following PIDs using the data monitor function.<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• APP<br>• TP<br>• MAP<br>• VSS<br>Do the PIDs indicate the correct values according to the engine operating condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 12 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 16. |
| | | No | Go to the next step. |
| 13 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 15. |
| 14 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 16. |
| | | No | Replace the delivery pipe. |
| 15 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 19. |
| | | No | Go to the next step. |
| 16 | Inspect the turbocharger.<br>(See01-13-17 TURBOCHARGER INSPECTION[L3 WITH TC].)<br>Is there any problem in turbocharger? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 17 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 18 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 19 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.15 EMISSION COMPLIANCE[L3 WITH TC]

id010339802100

| 15 | EMISSION COMPLIANCE |
|---|---|
| DESCRIPTION | Fails emissions test. |
| POSSIBLE CAUSE | • Poor fuel quality<br>• Vacuum lines leakage or blockage<br>• Cooling system malfunction<br>• Engine overheating<br>• Spark plug malfunction<br>• Air leakage from intake-air system<br>• Variable swirl system malfunction<br>• Wastegate control system improper operation<br>• Turbocharger malfunction<br>• Charge air cooler malfunction<br>• Inadequate fuel pressure (high-pressure side)<br>• PCV valve malfunction or incorrect valve installation<br>• EGR system malfunction<br>• Exhaust system and/or three-way catalytic converter restriction<br>• Fuel tank ventilation system malfunction<br>• Charcoal canister damage<br>• Air cleaner element clogging or restriction<br>• Throttle body malfunction<br>• Improper operation of electronic throttle control system<br>• Relief valve malfunction (built-in delivery pipe)<br>• Suction control valve malfunction (built-in high pressure fuel pump)<br>• Improper air/fuel mixture ratio control operation<br>• Erratic or no signal from CMP sensor<br>• Erratic signal from CKP sensor<br>• Front or rear HO2S or related circuit malfunction<br>• ECT or related circuit malfunction<br>• MAF sensor or related circuit malfunction<br>• IAT sensor No.1 or related circuit malfunction<br>• IAT sensor No.2 or related circuit malfunction<br>• Fuel pressure sensor or related circuit malfunction<br>• Accelerator position sensor or related circuit malfunction<br>• TP sensor or related circuit malfunction<br>• Manifold absolute pressure (MAP) sensor or related circuit malfunction<br>• VSS or related circuit malfunction<br>• Fuel line restriction<br>• High pressure fuel pump malfunction<br>• Fuel injector or related circuit malfunction<br>• Incorrect fuel injection timing<br>• Three-way catalytic converter (TWC) malfunction<br>• Engine internal parts malfunction<br>• Excessive carbon is built-up in combustion chamber<br>• Improper engine compression<br>• Improper valve timing<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Is the engine overheating? | Yes | Go to symptom troubleshooting “NO.17 COOLING SYSTEM CONCERNS - OVERHEATING.” |
| | | No | Go to the next step. |
| 2 | Is the engine runs cold? | Yes | Go to symptom troubleshooting “NO.18 COOLING SYSTEM CONCERNS - RUNS COLD.” |
| | | No | Go to the next step. |
| 3 | Connect the M-MDS to the DLC.<br>Perform the self-test function using the M-MDS.<br>Turn the ignition switch to the ON position.<br>Retrieve any DTCs.<br>Is a DTC displayed? | Yes | DTC is displayed:<br>Go to appropriate DTC test. |
| | | No | No DTC is displayed:<br>Go to the next step. |
| 4 | Inspect for the following.<br>• Fuel quality (proper octane, contamination, winter/summer blend)<br>• Charge air cooler condition (restriction or damaged)<br>• Air cleaner element (clogging or restriction)<br>• Intake-air system leakage<br>• PCV valve installation<br>• Vacuum line leakage or blockage<br>• Fuel leakage at fuel system<br>• Charcoal canister damaged<br>• Exhaust system and/or three-way catalytic converter restriction<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 4. |
| 5 | Perform the EGR system operation inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the EGR system operate properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 6 | Perform the TP sweep inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the electronic throttle control system work properly? | Yes | Visually inspect the throttle body (damaged/ scratching.) If normal, go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 7 | Perform the Variable Swirl Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 8 | Perform the Wastegate Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 9 | Perform the Evaporative Emission (EVAP) System Leak Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the variable swirl system work properly? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 10 | Remove and shake the PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 11 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 12 | Inspect CMP and CKP sensor for the following;<br>• Installation condition<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>• Damaged trigger wheel and camshaft<br>• Open or short circuit in the wiring harnesses<br>Is there any malfunction detected? | Yes | Repair or replace the malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |
| 13 | Connect the M-MDS to the DLC-2.<br>Access and monitor the following PIDs using the data monitor function.<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• APP<br>• TP<br>• MAP<br>• VSS<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Do the PIDs indicate the correct values according to the engine operating condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 14 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 18. |
| | | No | Go to the next step. |
| 15 | Is the vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 17. |
| 16 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 18. |
| | | No | Replace the delivery pipe. |
| 17 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 22. |
| | | No | Go to the next step. |
| 18 | Inspect the turbocharger.<br>(See01-13-17 TURBOCHARGER INSPECTION[L3 WITH TC].)<br>Is there any problem in turbocharger? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 19 | Inspect the three-way catalytic converter (TWC).<br>Is the TWC normal? | Yes | Go to the next step. |
| | | No | Replace the TWC. |
| 20 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Are fuel injectors normal? | Yes | Go to the next step. |
| | | No | Replace the suspected fuel injector.<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 21 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Replace the injector driver module.<br>If the problem remains, overhaul the engine. |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 22 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |



### NO.16 HIGH OIL CONSUMPTION/LEAKAGE[L3 WITH TC]

id010339802200

| 16 | HIGH OIL CONSUMPTION/LEAKAGE |
|---|---|
| DESCRIPTION | Oil consumption is excessive. |
| POSSIBLE CAUSE | • PCV valve malfunction<br>• Improper dipstick<br>• Improper engine oil viscosity<br>• Engine internal parts malfunction<br>• Seal leakage at the compressor or turbine end of turbocharger (indicated by oil in housing on wheel)<br>• Oil leakage |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Remove and shake the PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |
| 2 | Verify the following:<br>• Proper dipstick<br>• Proper engine oil viscosity<br>• Engine oil level<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 2. |
| 3 | Inspect the oil leakage from outside of the engine.<br>Is there any oil leakage found? | Yes | Repair or replace oil leakage part. |
| | | No | Go to the next step. |
| 4 | Remove the parts to necessary to inspect turbocharger without removing the turbocharger.<br>Visually inspect for the oil leakage inside turbocharger compressor and turbine housing.<br>Is any engine oil found inside turbocharger compressor or turbine housing? | Yes | Excessive amount of oil is found:<br>Replace the turbocharger.<br>Small amount of oil is found:<br>Wipe oil out of vehicle, then go to the next step. |
| | | No | Go to the next step. |
| 5 | Is any engine oil found around oil pipes attached on turbocharger center housing? | Yes | If oil leaks from damaged pipe, replace oil pipe.<br>Install the removed parts at Step 4. |
| | | No | Inspect internal engine parts such as valves, valve guides, valve stem seals, cylinder head drain passage, and piston rings.<br>Then install the removed parts at Step 4. |
| 6 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.17 COOLING SYSTEM CONCERNS-OVERHEATING[L3 WITH TC]

id010339802300

| 17 | COOLING SYSTEM CONCERNS -OVERHEATING |
|---|---|
| DESCRIPTION | Engine runs at higher than normal temperature/overheats. |
| POSSIBLE CAUSE | • Improper coolant level<br>• Blown fuse<br>• Coolant leakage (engine internal, turbocharger, external)<br>• Excessive A/C system pressure<br>• A/C system operation is improper<br>• Improper water/anti-freeze mixture<br>• Fans reverse rotation<br>• Poor radiator condition<br>• Thermostat malfunction<br>• Radiator hose damage<br>• Cooling fan inoperative<br>• Condenser fan inoperative<br>• Improper or damaged radiator cap<br>• Coolant overflow system malfunction<br>• Improper drive belt tension<br>• Drive belt damage |

### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect for the following:<br>• Engine coolant level<br>• Coolant leakage (around heater unit in passenger compartment, coolant hoses and/or radiator.)<br>• Water and anti-freeze mixture<br>• Radiator condition<br>• Collapsed or restricted radiator hoses<br>• Radiator pressure cap<br>• Coolant overflow system<br>• Fan rotational direction<br>• Fan rotation direction<br>• Fuses<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 1.Service if necessary. |
| 2 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Is there any DTCs displayed? | Yes | DTC is displayed:<br>Go to appropriate DTC test. |
| | | No | No DTC is displayed:<br>Go to the next step. |
| 3 | Perform the KOEO and KOER self-test function using the M-MDS.<br>(See01-02-10 KOEO/KOER SELF TEST[L3 WITH TC].)<br>Is there any DTCs displayed? | Yes | DTC is displayed:<br>Go to appropriate DTC test. |
| | | No | No DTC is displayed: Go to the next step. |
| 4 | Start the engine and run it at idle speed.<br>Turn the A/C switch off.<br>Does the A/C compressor disengaged? | Yes | Go to the next step. |
| | | No | Go to symptom troubleshooting “NO.24 A/C ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY.” (See01-03-69 NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY[L3 WITH TC].) |
| 5 | Perform the Cooling Fan Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the cooling fan system operate properly? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning part, according to inspection results. |
| 6 | Is the drive belt normal? | Yes | Go to the next step. |
| | | No | Replace the drive belt. |
| 7 | Is there any leakage around heater unit in passenger compartment? | Yes | Inspect and service heater unit for leakage. |
| | | No | Go to the next step. |
| 8 | Is there any leakage at coolant hoses and/or radiator? | Yes | Replace the malfunctioning part. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 9 | Cool down the engine.<br>Remove the thermostat and inspect operation.<br>(See01-12-11 THERMOSTAT REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-12-11 THERMOSTAT INSPECTION[L3 WITH TC].)<br>Is thermostat normal? | Yes | Thermostat is normal.<br>Inspect the cylinder block for leakage or blockage. |
| | | No | Access the ECT PID using the M-MDS.<br>Inspect for both ECT PID and temperature gauge readings.<br>If the temperature gauge on instrument cluster indicates normal but ECT PID is not same as temperature gauge reading, inspect the ECT sensor.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>If the temperature gauge on instrument cluster indicates overheating but ECT PID is normal, inspect the instrument cluster.<br>(See09-22-3 INSTRUMENT CLUSTER INSPECTION.) |
| 10 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |



### NO.18 COOLING SYSTEM CONCERNS-RUNS COLD[L3 WITH TC]

id010339802400

| 18 | COOLING SYSTEM CONCERNS - RUNS COLD |
|---|---|
| DESCRIPTION | Engine takes excessive time to reach normal operating temperature. |
| POSSIBLE CAUSE | • Thermostat malfunction<br>• Condenser fan system malfunction<br>• Cooling fan system malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Is customer complaint “Lack of passenger compartment heat” only? | Yes | Inspect the A/C heater system. |
| | | No | Go to the next step. |
| 2 | Does the engine speed continue at fast idle? | Yes | Go to symptom troubleshooting “NO.9 FAST IDLE/ RUNS ON.”<br>(See01-03-37 NO.9 FAST IDLE/RUNS ON[L3 WITH TC].) |
| | | No | Go to the next step. |
| 3 | Cool down the engine.<br>Remove the thermostat and inspect operation.<br>(See01-12-11 THERMOSTAT REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-12-11 THERMOSTAT INSPECTION[L3 WITH TC].)<br>Is thermostat normal? | Yes | Go to the next step. |
| | | No | Replace the thermostat. |
| 4 | Perform the Cooling Fan Control System Operation Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Does the cooling fan system operate properly? | Yes | Access the ECT PID using the M-MDS.<br>Inspect for both ECT PID and temperature gauge readings.<br>If the temperature gauge on instrument cluster indicates normal but ECT PID is not same as temperature gauge reading, inspect the ECT sensor.<br>(See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)<br>If the temperature gauge on instrument cluster indicates overheating but ECT PID is normal, inspect the instrument cluster.<br>(See09-22-3 INSTRUMENT CLUSTER INSPECTION.) |
| | | No | Repair or replace malfunctioning part, according to inspection results. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 5 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

### NO.19 EXCESSIVE BLACK SMOKE[L3 WITH TC]

id010339802500

| 19 | EXHAUST SMOKE |
|---|---|
| DESCRIPTION | Blue, black, or smoke from the exhaust system |
| POSSIBLE CAUSE | **Blue smoke (Burning oil):**<br>• PCV valve malfunction<br>• Engine internal oil leakage<br>• Oil leakage at the compressor or turbine end of the turbocharger<br>**White smoke (Water in combustion):**<br>• Cooling system malfunction (coolant loss)<br>• Engine internal coolant leakage<br>• Coolant leakage at the compressor or the turbine end of the turbocharger<br>**Black smoke (Rich fuel mixture):**<br>• Air cleaner restriction<br>• Intake-air system is collapsed or restricted<br>• Leakage at engine intake or exhaust manifold<br>• Wastegate valve malfunction (stuck open)<br>• Excessive fuel pressure<br>• Improper engine compression<br>• Ignition system malfunction<br>• Improper fuel injection timing and amount<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | What color is smoke coming from the exhaust system? | Blue | Burning oil is indicated.<br>Go to the next step. |
| | | White | Water in combustion is indicated.<br>Go to the Step 5. |
| | | Black | Rich fuel mixture is indicating.<br>Go to the Step 6. |
| 2 | Remove and shake the PCV valve.<br>Does the PCV valve rattle? | Yes | Go to the next step. |
| | | No | Replace the PCV valve. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 3 | Remove the parts necessary to inspect turbocharger without removing the turbocharger. Visually inspect for the turbocharger compressor housing. Is any engine oil found inside turbocharger compressor housing? | Yes | Install all parts removed in this step. **Perform the following, according to inspection results. Excessive amount of oil is found:** Replace the turbocharger. **Small amount of oil is found:** Wipe oil out of vehicle, then Go to the next step. |
| | | No | Turbocharger is normal. Install all parts removed in this step. Then, Go to the next step. |
| 4 | Inspect for the following engine internal parts.<br>• Damaged valve guide, stems or valve seals<br>• Blocked oil drain passage in cylinder head<br>• Piston ring is not seated, seized or worn<br>• Damage cylinder bore<br>Are there ant problem found? | Yes | Repair or replace suspected parts, according to the inspection results. |
| | | No | Engine internal parts are normal. If other driveability symptoms are present, return to diagnostic index to service additional symptoms. |
| 5 | Does cooling system hold the coolant pressure? (See01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].) | Yes | Inspect for the following:<br>• Cylinder head gasket leakage<br>• Intake manifold gasket leakage<br>• Cracked or porous engine block<br>If other driveability symptoms are present, return to diagnostic index to service additional symptoms. |
| | | No | Inspect for the cause. |
| 6 | Inspect for the following for intake-air system.<br>• Air cleaner restriction<br>• Collapsed or restricted<br>• Leakage<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Repair or replace the suspected part. |
| 7 | Connect the M-MDS to the DLC-2. Access following PIDs.<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• APP<br>• TP<br>• MAP<br>• VSS<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Monitor the PIDs under the black smoke appeared engine condition. Do all PID indicate normal according to engine conditions? | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and the the related harnesses. If the malfunction remains, perform the intermittent concern troubleshooting procedure. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 8 | Inspect the wastegate. (See01-13-16 WASTEGATE ACTUATOR INSPECTION[L3 WITH TC].) Does the wastegate stuck open? | Yes | Perform the wastegate control system operation inspection. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].) Repair or replace malfunctioning part according to the inspection results. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 9 | Connect the M-MDS to DLC-2.<br>Access and monitor following PIDs using the data monitor function.<br>• ECT<br>• MAF<br>• IAT<br>• IAT2<br>• APP<br>• TP<br>• MAP<br>• VSS<br>• O2S11<br>• O2S12<br>• LONGFT1<br>• SHTFT1<br>Do the PIDs indicate correct values under trouble condition?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Inspect and repair or replace suspected parts and related harnesses.<br>If the malfunction remains, perform the intermittent concern troubleshooting procedure.<br>(See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].) |
| 10 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 14. |
| | | No | Go to the next step. |
| 11 | Is vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 13. |
| 12 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 14. |
| | | No | Replace the delivery pipe. |
| 13 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Retest Step 16. |
| | | No | Go to the next step. |
| 14 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Inspect or replace the malfunctioning parts, according to the inspection results. |
| 15 | Measure the compression pressure for each cylinder.<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>Are compression pressures within the specification? | Yes | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC]) |
| | | No | Inspect for the following:<br>• Damaged valve seat<br>• Worn valve stem and valve guide<br>• Worn or stuck piston ring<br>• Worn piston, piston ring or cylinder<br>• Improper valve timing<br>Service if necessary. |
| 16 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.20 FUEL ODOR (IN ENGINE COMPARTMENT)[L3 WITH TC]

id010339802600

| 20 | FUEL ODOR (IN ENGINE COMPARTMENT) |
|---|---|
| DESCRIPTION | Gasoline fuel smell or visible leakage |
| POSSIBLE CAUSE | • Excessive fuel pressure<br>• Purge solenoid valve malfunction<br>• Fuel system vent system blockage<br>• Evaporative gas leakage<br>• Improper connection of evaporative related vacuum hoses<br>• Charcoal canister malfunction<br>• Fuel leakage from fuel system<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>**• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>**• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>**• Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Visually inspect fuel leakage at fuel line.<br>Is there any fuel leakage? | Yes | Service if necessary. |
| | | No | Go to the next step. |
| 2 | Inspect the vacuum hose routine.<br>(See01-13-4 VACUUM HOSE ROUTING DIAGRAM[L3 WITH TC].)<br>Are vacuum hoses routines properly? | Yes | Go to the next step. |
| | | No | Reconnect the vacuum hose. |
| 3 | Perform the Evaporative Emission (EVAP) System Leak Inspection.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is there any problem found? | Yes | Repair or replace suspected part according to the inspection results. |
| | | No | Go to the next step. |
| 4 | Inspect the airflow of purge solenoid valve.<br>(See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)<br>Is the purge solenoid airflow properly? | Yes | Go to the next step. |
| | | No | Replace the purge solenoid valve. |
| 5 | Connect the M-MDS to the DLC-2.<br>Access the FUEL_PRESPID.<br>Monitor the FUEL_PRES PID while idle and race the engine.<br>Is the FUEL_PRES PID indicate**15 MPa {153 kgf/cm$^2$, 2175 psi} or less**? | Yes | Inspect the charcoal canister for fuel saturation.<br>If excess amount of liquid fuel is present, replace the charcoal canister. |
| | | No | Inspect the fuel pressure sensor and the high pressure fuel pump.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>(See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].) |
| 5 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## NO.21 ENGINE NOISE[L3 WITH TC]

id010339802700

| 21 | ENGINE NOISE |
|---|---|
| DESCRIPTION | Engine noise under hood |
| POSSIBLE CAUSE | **Squeal, click or chirp noise:**<br>• Improper engine oil level<br>• Loose installation of solenoid valves<br>• Improper drive belt tension<br>**Rumble or grinding sound noise:**<br>• Loose parts<br>• Fluid revel low or air in power the steering fluid<br>• Improper drive belt tension<br>**Hiss sound noise:**<br>• Vacuum leakage<br>• Loose spark plug<br>• Air leakage from the intake-air system<br>**Rattle noise:**<br>• Loose parts<br>**Rap or roar noise:**<br>• Exhaust system looseness<br>**Excessive noise from turbocharger**:<br>• Foreign objects or material in the compressor inlet to the intake manifold ducting or the compressor housing<br>• Carbon built-up in the turbine housing<br>• Turbocharger routing assembly banding or dragging<br>• Loose intake or exhaust ducting systems<br>**Other noise:**<br>• Camshaft friction gear noise or MLA noise<br>• Timing chain noise<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before performing the fuel system services:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR ROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Is the noise from the turbocharger? | Yes | Go to Step 8. |
| | | No | Go to the next step |
| 2 | Is squeal, click or chirp sound present? | Yes | Inspect the engine oil level, solenoid valves installation or drive belt tension. |
| | | No | Go to the next step. |
| 3 | Is rumble or grinding sound present? | Yes | Inspect and repair the following;<br>• Drive belt tension<br>• Loose parts in engine compartment<br>• Power steering system fluid level<br>If normal, perform the power steering fluid line air bleed.<br>(See06-14-3 AIR BLEEDING.) |
| | | No | Go to the next step. |
| 4 | Is rattle sound present? | Yes | Inspect the location of rattle for loose parts. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 5 | Is hiss sound present? | Yes | Inspect and repair the following;<br>• Vacuum leakage<br>• Spark plug looseness<br>• Intake-air system leakage |
| | | No | Go to the next step. |
| 6 | Is rap or roar sound present? | Yes | Inspect the exhaust system or loose parts. |
| | | No | Go to the next step. |
| 7 | Is knocking noise present? | Yes | Go to symptom troubleshooting “NO.13 KNOCKING/PINGING”.<br>(See01-03-50 NO.13 KNOCKING/PINGING[L3 WITH TC].) |
| | | No | If noise comes from engine internal, inspect for the friction gear, timing chain or MLA noise. |
| 8 | Inspect the intake and exhaust housing system for loose installation.<br>Is there any problem found? | Yes | Repair installation or replace suspected part. |
| | | No | Go to the next step. |
| 9 | Remove the parts necessary to inspect turbocharger without removing the turbocharger. Inspect if turbocharger compressor wheel is bent, damaged, or interfering with housing on vehicle.<br>Is there any problem? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 10 | Inspect the turbocharger compressor wheel locknut is loose or has fallen down inside turbocharger.<br>Is there any problem? | Yes | Replace the turbocharger. |
| | | No | Go to the next step. |
| 11 | Turn the turbocharger compressor wheel by hand.<br>Does the wheel turn easily and smoothly? | Yes | Go to the next step. |
| | | No | Replace the turbocharger. |
| 12 | Visually inspect the turbine housing.<br>Is there any carbon built-up or foreign material on turbine housing? | Yes | Clean built-up carbon or remove foreign materials.<br>If turbine housing damaged, replace the turbocharger. |
| | | No | Install the removal parts at Step 9, and inspect all turbocharger related parts installed correctly. |
| 13 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

### NO.22 VIBRATION CONCERNS (ENGINE)[L3 WITH TC]

id010339802800

| 22 | VIBRATION CONCERNS (ENGINE) |
|---|---|
| DESCRIPTION | • Vibration from under the hood or driveline |
| POSSIBLE CAUSE | • Loose attaching bolts or worn parts<br>• Components malfunction such as worn parts |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Inspect the following components for loose attaching bolts or worn parts:<br>• Cooling fan<br>• Condenser fan<br>• Drive belt and pulley<br>• Engine mounts<br>• Exhaust system<br>Are all items normal? | Yes | Inspect the following systems:<br>• Wheels<br>• Transmission and mounts<br>• Driveline<br>• Suspension<br>Service if necessary. |
| | | No | Readjust or retighten suspect parts installation position.<br>Service if necessary for other parts. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 2 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

### NO.23 A/C DOES NOT WORK SUFFICIENTLY[L3 WITH TC]

id010339802900

| 23 | A/C DOES NOT WORK SUFFICIENTLY. |
|---|---|
| DESCRIPTION | A/C compressor magnetic clutch does not engage when A/C switch is turned on. |
| POSSIBLE CAUSE | • Improper refrigerant charging amount<br>• Open A/C magnetic clutch<br>• Open circuit between the A/C relay and the A/C magnetic clutch<br>• Poor ground of A/C magnetic clutch<br>• Refrigerant pressure switch is stuck open.<br>• A/C relay is stuck open.<br>• Seized A/C compressor<br>• Open circuit between the A/C switch and the PCM through both the refrigerant pressure switch and the A/C amplifier |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Are there any DTCs displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test. |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 2 | Disconnect the A/C compressor connector.<br>Start the engine and turn the A/C switch on.<br>Is there correct voltage at terminal of A/C compressor magnetic clutch connector?<br>**Specification**<br>**10.5 V or more** | Yes | Inspect for the ground condition of magnetic clutch on A/C compressor.<br>If ground condition is normal, inspect for an open circuit magnetic clutch coil. |
| | | No | Go to the next step. |
| 3 | Disconnect the refrigerant pressure switch connector.<br>Connect jumper wire between terminals of A/C high-pressure switch connector.<br>Connect jumper wires between terminals of refrigerant pressure switch connector.<br>Turn the ignition switch to the ON position.<br>Turn A/C switch on and set blower fan to any speed.<br>Does A/C work? | Yes | Inspect the refrigerant pressure switch operation.<br>If switch is normal, go to the next step. |
| | | No | Inspect for the following:<br>• A/C switch is stuck open.<br>• Open circuit between refrigerant pressure switch and PCM terminal 1AC<br>• Open circuit between blower motor fan switch and resistor (if blower motor does not operate)<br>• Evaporator temperature sensor and A/C amplifier |
| 4 | Remove jumper wire from switch connector.<br>Reconnect connector to refrigerant pressure switch.<br>Start engine and turn A/C switch on.<br>Does fan operate? | Yes | Inspect the whether A/C relay is stuck open.<br>Replace if necessary. |
| | | No | Inspect the following and repair or replace if necessary:<br>• Refrigerant charging amount<br>• A/C compressor for seizure |
| 5 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.le. Retest. | | |

## NO.24 A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY[L3 WITH TC]

id010339803000

| 24 | A/C IS ALWAYS ON OR A/C COMPRESSOR RUNS CONTINUOUSLY. |
|---|---|
| DESCRIPTION | A/C compressor magnetic clutch does not disengage. |
| POSSIBLE CAUSE | • A/C compressor magnetic clutch engagement is stuck.<br>• A/C relay is stuck closed.<br>• Short to ground between A/C switch and PCM<br>• Short to ground circuit between A/C relay and PCM<br>• A/C relay to magnetic clutch circuit shorted to battery power |



### Diagnostic procedure

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Are there any DTCs displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test. |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 2 | Start the engine and idle it.<br>Turn the A/C switch on.<br>Remove the A/C relay.<br>Does the A/C magnetic clutch disengage? | Yes | Inspect for the following:<br>• A/C relay is stuck closed.<br>• Short to ground circuit between A/C relay and PCM terminal 1I.<br>If both items normal, go to the next step. |
| | | No | Inspect if circuit between A/C relay and magnetic clutch shorts to battery power circuit.<br>If circuit is normal, inspect magnetic clutch for stuck engagement or clearance. |
| 3 | Disconnect the refrigerant pressure switch connector.<br>Start the engine and turn the A/C switch on.<br>**Note**<br>• A/C should not work when disconnecting connector. If A/C remains working, short to ground circuit may be present.<br>Does A/C remain working? | Yes | Inspect for a short to ground circuit between refrigerant pressure switch and PCM terminal 1AU. |
| | | No | Go to the next step. |
| 4 | Reconnect refrigerant pressure switch connector.<br>Turn off A/C switch.<br>**Note**<br>• A/C should not work when turning A/C switch off. If A/C remains working, short to ground circuit may be present.<br>Does A/C remain working? | Yes | Inspect for the following:<br>• Short to ground circuit between A/C switch and A/C amplifier<br>• Short to ground circuit between A/C amplifier and refrigerant pressure switch |
| | | No | Inspect the whether A/C switch is stuck closed. |
| 5 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.le. Retest. | | |

## NO.25 A/C IS NOT CUT OFF UNDER WIDE OPEN THROTTLE CONDITIONS[L3 WITH TC]

id010339803100

| 25 | A/C IS NOT CUT OFF UNDER WOT CONDITIONS. |
|---|---|
| DESCRIPTION | A/C compressor magnetic clutch does not disengage under WOT. |
| POSSIBLE CAUSE | • Accelerator position sensor malfunction<br>• Loosely installed accelerator position sensor. |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Does the A/C compressor disengage when A/C switch is turned off? | Yes | Go to the next step. |
| | | No | Go to symptom troubleshooting “No.24 A/C is always on or A/C compressor runs continuously”. |
| 2 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Are there any DTCs displayed? | Yes | **DTC is displayed:**<br>Go to appropriate DTC test. |
| | | No | **No DTC is displayed:**<br>Inspect the accelerator position sensor. |
| 3 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.le. Retest. | | |

## NO.26 EXHAUST SULPHUR SMELL[L3 WITH TC]

id010339803200

| 26 | EXHAUST SULPHUR SMELL |
|---|---|
| DESCRIPTION | Rotten egg smell (sulphur) from exhaust |
| POSSIBLE CAUSE | • Electrical connectors are disconnected or connected poorly<br>• Charcoal canister malfunction<br>• Vacuum lines are disconnected or connected improperly.<br>• Improper fuel pressure<br>• Poor fuel quality<br><br>**Warning**<br>**The following troubleshooting flow chart contains fuel system diagnosis and repair procedures. Read following warnings before servicing fuel system:**<br>**• Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>**• Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete “BEFORE REPAIR PROCEDURE” and “AFTER REPAIR PROCEDURE” described in this manual.**<br>**(See 01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See 01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>**• Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Are any driveability or exhaust smoke concerns present? | Yes | Go to the appropriate flow chart. |
| | | No | Go to the next step. |
| 2 | Inspect for the following:<br>• Electrical connections<br>• Vacuum lines<br>• Fuel quality<br>Are all items normal? | Yes | Go to the next step. |
| | | No | Service if necessary.<br>Repeat Step 2. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 3 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Are there any DTCs displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test. |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 4 | Access and monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See 01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 5 | Is vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 7. |
| 6 | Inspect the fuel pressure sensor.<br>(See 01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 7 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See 01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 9. |
| | | No | Go to the next step. |
| 8 | Inspect the charcoal canister for fuel saturation.<br>Is excess amount of liquid fuel present in canister? | Yes | Replace the charcoal canister. |
| | | No | Inspect the fuel tank vent system.<br>If fuel tank vent system is normal, suggest trying a different brand since sulfur content can vary in different fuels.<br>If fuel tank vent system is not normal, repair or replace the malfunctioning parts. |
| 9 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.le. Retest. | | |

### NO.27 FUEL REFILL CONCERNS[L3 WITH TC]

id010339803300

| 27 | Fuel refill concerns |
|---|---|
| DESCRIPTION | • Fuel tank does not fill smoothly. |
| POSSIBLE CAUSE | • Clogged EVAP pipes<br>• Nonreturn valve malfunction<br>• Improper use of fuel nozzle<br>• Inadequate fuel filling speed<br><br>**Warning**<br>• **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:**<br>**— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>**— Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Are there any DTCs displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test. |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 2 | Remove the fuel-filler pipe.<br>Make sure nonreturn valve is installed properly.<br>Inspect the nonreturn valve operation.<br>Is nonreturn valve normal? | Yes | Inspect for the following:<br>• Improper use of fuel nozzle<br>• Inadequate fuel filling speed |
| | | No | **Nonreturn valve is installed improperly:**<br>• Reinstall the nonreturn valve to proper position.<br>**Nonreturn valve does not operate properly:**<br>• Replace the nonreturn valve. |
| 3 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest.le. Retest. | | |

## NO.28 FUEL FILLING SHUT OFF ISSUES[L3 WITH TC]

id010339803400

| 28 | Fuel filling shut off issues |
|---|---|
| DESCRIPTION | • Fuel does not shut off properly. |
| POSSIBLE CAUSE | • Clogged EVAP pipes<br>• Nonreturn valve malfunction<br>• Fuel shut-off valve malfunction<br>• Fuel nozzle malfunction<br>• Fuel nozzle is not inserted correctly.<br><br>**Warning**<br>• **The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:**<br>**— Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>**— Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Connect the M-MDS to the DLC-2.<br>Turn the ignition switch to the ON position (Engine off).<br>Retrieve any DTCs.<br>Are there any DTCs displayed? | Yes | **DTC is displayed:**<br>Go to the appropriate DTC test. |
| | | No | **No DTC is displayed:**<br>Go to the next step. |
| 2 | Remove the fuel-filler pipe.<br>Make sure nonreturn valve is installed properly.<br>Inspect the nonreturn valve operation.<br>Is nonreturn valve normal? | Yes | Inspect for the following:<br>• Improper use of fuel nozzle<br>• Fuel is not inserted correctly.<br>• Inspect fuel shut-off valve. |
| | | No | **Nonreturn valve is installed improperly:**<br>• Reinstall the nonreturn valve to proper position.<br>**Nonreturn valve does not operate properly:**<br>• Replace the nonreturn valve. |

| STEP | INSPECTION | ACTION |
|---|---|---|
| 3 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | |



### NO.29 SPARK PLUG CONDITION[L3 WITH TC]

id010339803600

| 29 | SPARK PLUG CONDITION |
|---|---|
| DESCRIPTION | Incorrect spark plug condition |
| POSSIBLE CAUSE | **Note**<br>• Inspecting the condition of the spark plugs can determine whether a problem is related to a specific cylinder or possibly all cylinders.<br><br>**Wet/carbon stuck on specific plug:**<br>• Spark— Weak, not visible<br>• Air/fuel mixture— Excessive fuel injection volume<br>• Compression— No compression, low compression<br>• Malfunctioning spark plug<br>**Grayish white with specific plug:**<br>• Air/fuel mixture— Insufficient fuel injection volume<br>• Malfunctioning spark plug<br>**Wet/carbon is stuck on all plugs:**<br>• Spark— Spark weak<br>• Air/fuel mixture— Too rich<br>• Compression— Low compression<br>• Clogging in intake/exhaust system<br>**Grayish white with all plugs:**<br>• Air/fuel mixture— Too lean<br><br>**Warning**<br>**The following troubleshooting flow chart contains the fuel system diagnosis and repair procedures. Read the following warnings before servicing the fuel system:**<br>• **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**<br>• **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete "BEFORE REPAIR PROCEDURE" and "AFTER REPAIR PROCEDURE" described in this manual.**<br>**(See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**<br>**(See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)**<br><br>**Caution**<br>• **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting, and make sure that it is free of foreign material.** |

**Diagnostic procedure**

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 1 | Remove all the spark plugs.<br>Inspect the spark plug condition.<br>Is the spark plug condition normal? | Yes | Troubleshooting completed. |
| | | No | **Specific plug is wet or covered with carbon:**<br>Go to the next step.<br>**Specific plug looks grayish white:**<br>Go to Step 9.<br>**All plugs are wet or covered with carbon:**<br>Go to Step 11.<br>**All plugs look grayish white:**<br>Go to Step 19. |
| 2 | Is the spark plug wet/covered with carbon from engine oil? | Yes | Inspect all areas related to oil. |
| | | No | Go to the next step. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 3 | Inspect the spark plugs for the following:<br>• Cracked insulator<br>• Heat range<br>• Air gap<br>• Worn electrode<br>Is the spark plug normal? | Yes | Go to the next step. |
| | | No | Replace the spark plug. |
| 4 | Inspect the compression pressure at the suspected malfunctioning cylinder.<br>Is the compression pressure correct?<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].) | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts. |
| 5 | Install all the spark plugs.<br>Perform the spark test at the suspected malfunctioning cylinder.<br>Is a strong blue spark visible?<br>(Compare with normal cylinder.) | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts. |
| 6 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Inspect the suspected cylinders fuel injector for the following:<br>• Open or short circuit in the fuel injector<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].) |
| | | No | Go to the next step. |
| 7 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the delivery pipe. |
| 8 | Inspect the high pressure fuel pump.<br>(See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>Is the high pressure fuel pump normal? | Yes | Replace the delivery pipe.<br>Retest Step 6<br>If the FUEL_PRES PID indication is other that the specification, replace the high pressure fuel pump. |
| | | No | Replace the high pressure fuel pump. |
| 9 | Inspect the spark plug for the following.<br>• Heat range<br>• Air gap<br>Is the spark plug normal? | Yes | Go to the next step. |
| | | No | Replace the spark plug. |
| 10 | Perform the KOER self-test function using the M-MDS.<br>(See01-02-10 KOEO/KOER SELF TEST[L3 WITH TC].)<br>Is the suspected cylinder injector circuit related DTC (P0201, P0202, P0203 or P0204) present? | Yes | Go to appropriate the DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Inspect the suspect cylinder fuel injector for the following:<br>• Resistance<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].) |
| 11 | Is the air cleaner element free of blockage? | Yes | Go to the next step. |
| | | No | Replace the air cleaner element. |
| 12 | Perform the spark test.<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is a strong blue spark visible at each cylinder? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts. |
| 13 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Go to step 16. |
| | | No | Go to the next step. |
| 14 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the delivery pipe. |
| 15 | Inspect the high pressure fuel pump.<br>(See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].)<br>Is the high pressure fuel pump normal? | Yes | Replace the delivery pipe.<br>Retest Step 13.<br>If the FUEL_PRES PID indication is other that the specification, replace the high pressure fuel pump. |
| | | No | Replace the high pressure fuel pump. |

| STEP | INSPECTION | RESULTS | ACTION |
|---|---|---|---|
| 16 | Inspect the following PIDs:<br>• ECT<br>• O2S11 (When engine can be started)<br>• MAF<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>Are the PIDs normal? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts. |
| 17 | Perform the purge control inspection.<br>(When engine can be started)<br>(See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)<br>Is the purge control correct? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts. |
| 18 | Perform the compression inspection.<br>Is the compression correct? | Yes | Inspect for clogging in the exhaust system. |
| | | No | Repair or replace the malfunctioning parts. |
| 19 | When the engine cannot be started, inspect the intake-air system for air leakage.<br>When the engine can be started, perform the intake manifold vacuum inspection.<br>Is air sucked in from the intake-air system? | Yes | Repair or replace the malfunctioning part. |
| | | No | Go to the next step. |
| 20 | Access and monitor the FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specification?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Inspect for the following PIDs:<br>• ECT<br>• O2S11<br>• O2S12<br>• MAF<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>Inspect the PCM ground condition. |
| | | No | Go to the next step. |
| 21 | Is vehicle accelerate performance normally? | Yes | Go to the next step. |
| | | No | Go to Step 13. |
| 22 | Inspect the fuel pressure sensor.<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)<br>Is the fuel pressure sensor normal? | Yes | Go to the next step. |
| | | No | Replace the delivery pipe. |
| 23 | Replace the high pressure fuel pump.<br>Monitor FUEL_PRES PID.<br>Is the FUEL_PRES PID value within the specified?<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].) | Yes | Troubleshooting is completed.<br>Go to Step 16. |
| | | No | Inspect following PIDs.<br>• ECT<br>• O2S11<br>• O2S12<br>• MAF<br>(See01-40-6 PCM INSPECTION[L3 WITH TC].)<br>Inspect PCM ground condition. |
| 24 | Verify test results.<br>• If normal, return to the diagnostic index to service any additional symptoms.<br>• If a malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform the repair or diagnosis.<br>— If the vehicle is repaired, troubleshooting is completed.<br>— If the vehicle is not repaired or additional diagnostic information is not available, reprogram the PCM if a later calibration is available. Retest. | | |

## INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC]

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### Vibration Method

- If a malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the steps below.

**Note**

- There are several reasons why the vehicle or engine vibration could cause an electrical malfunction. Check the following:
  - — Connectors are not fully seated.
  - — Wiring harnesses do not have full play.
  - — Wires laying across brackets or moving parts.
  - — Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause a wiring harness to become pinched between parts.
- The connector joints, points of vibration, and places where the wiring harnesses pass through the firewall and body panels are the major areas to be checked.

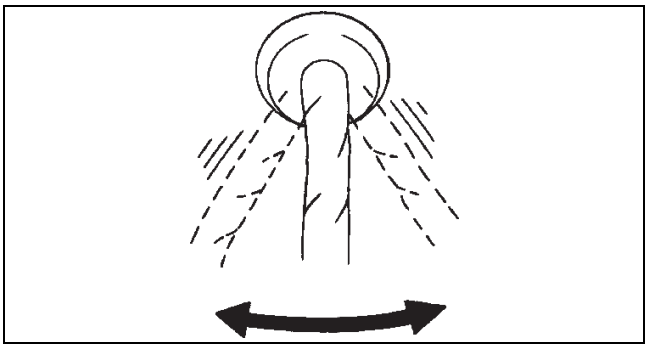
### Inspection Method for Switch Connectors or Wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (Engine off).

**Note**

- If engine starts and runs, perform the following steps during idle.

3. Access the PIDs for the switch you are inspecting.
4. Turn the switch on manually.
5. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, check for a poor connection.



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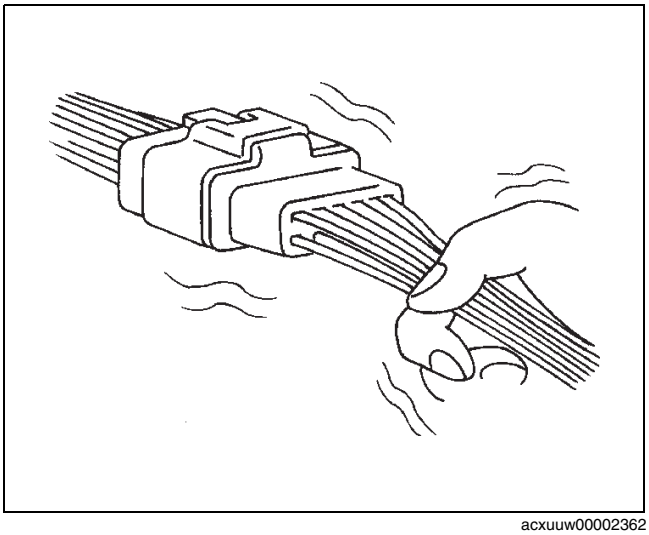
### Inspection Method for Sensor Connectors or Wires

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (Engine off).

**Note**

- If the engine starts and runs, perform the following steps during idling.

3. Access the PIDs for the switch you are inspecting.
4. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, check for poor connection.



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**Inspection Method for Sensors**

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (Engine off).

**Note**
- If the engine starts and runs, perform the following steps during idle.

3. Access the PIDs for the switch you are inspecting.
4. Shake the sensor slightly with your finger.
   - If the PID value is unstable or a malfunction occurs, check for a poor connection or a poorly mounted sensor or both.

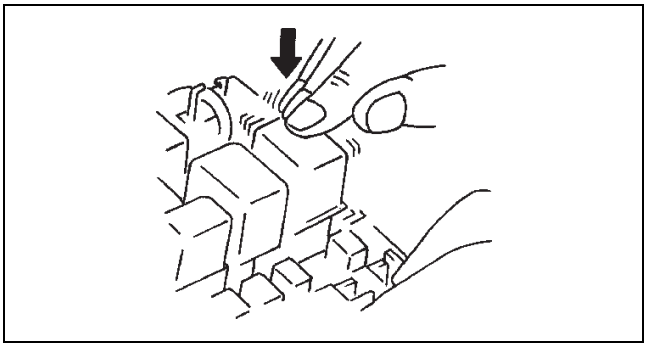
**Inspection Method for Actuators or Relays**

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (Engine off).

**Note**
- If engine starts and runs, perform the following steps during idling.

3. Prepare the output state control function for actuators or relays that you are inspecting.
4. Shake the actuator or relay with your finger for 3 s after the output state control function is activated.
   - If a variable click sound is heard, check for a poor connection or a poorly mounted actuator or both, or the relay.

**Note**
- Shake the relays too strongly may result in open circuits.



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**Water Sprinkling Method**

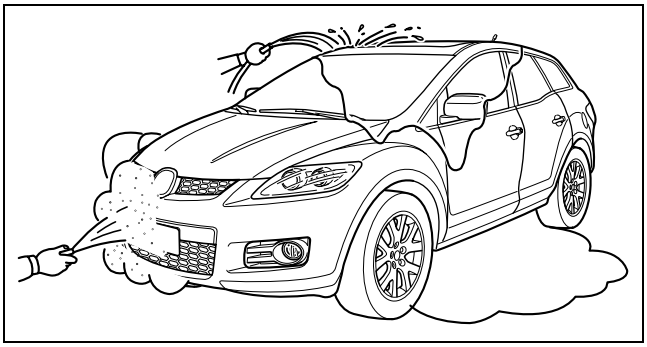
If a malfunction occurs only during high humidity or rainy/snowy weather, perform the following steps:

**Caution**
- **Indirectly change the temperature and humidity by spraying water onto the front of the radiator.**
- **If a vehicle is subject to water leakage, the leakage may damage the control module. When testing a vehicle with a water leakage problem, special caution must be used.**

1. Connect the M-MDS to the DLC-2 if you are inspecting sensors or switches.
2. Turn the ignition switch to the ON position (Engine off).

**Note**
- If the engine starts and runs, perform the following steps is idling.

3. Access the PIDs for the sensor or the switch if you are inspecting sensors or switches.
4. If you are inspecting the switch, turn it on manually.
5. Spray water onto the vehicle or run it through a car wash.
   - If the PID value is unstable or a malfunction occurs, repair or replace parts if necessary.



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## ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC]

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**Input Signal System Investigation Procedure**

1. Find an unusual signal. (See01-03-78 Finding unusual signals.)
2. Locate the source. (See01-03-78 Locating the source of unusual signals.)
3. Repair or replace the defective part.
4. Confirm that the unusual signal has been erased.

**Finding unusual signals**

While referring to 01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC], use the PID/DATA monitor and record function to inspect the input signal system relating to the problem.

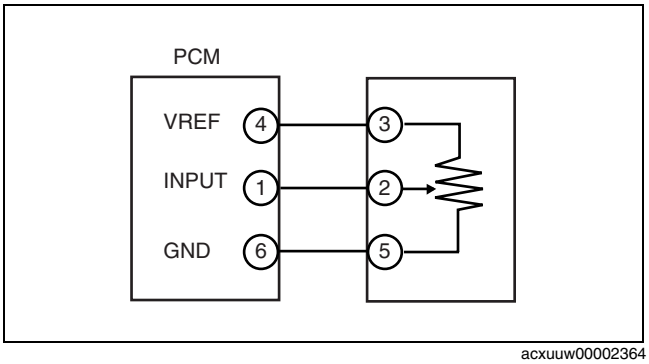
1. Start the engine and idle the vehicle. You can assume that any signals that are out of specification by a wide margin are unusual.
2. When recreating the problem, any sudden change in the monitor input signals that is not consciously created by the driver can be determined as unusual.

**Locating the source of unusual signals**

**Caution**

- **Compare the M-MDS monitor voltage with the measurement voltage using the digital measurement system function. If you use another tester, a misreading may occur.**
- **When measuring the voltage, attach the tester ground to the ground of the PCM that is being tested, or to the engine itself. If this is not done, the measured voltage and actual voltage may differ**
- **After connecting the pin to a waterproof coupler, confirm continuity and measure the voltage, and inspect the waterproof connector for cracks. If there are any, use sealant to fix them. Failure to do this may result in deterioration of the wiring harness or terminal from water damage, leading to problems with the vehicle.**

**Variable resistance type 1 (TP sensor)**

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**Investigate the input signal system for variable resistance type 1**

1. When an unusual signal is received, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the M-MDS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect for the following points concerning the PCM connector:
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Wiring harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and M-MDS voltages, inspect the wiring harness for open or short circuits.
   - If the sensor and M-MDS voltages are the same, inspect for the following points concerning the sensor connector:
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
   - If there are no problems, proceed to next investigation below.

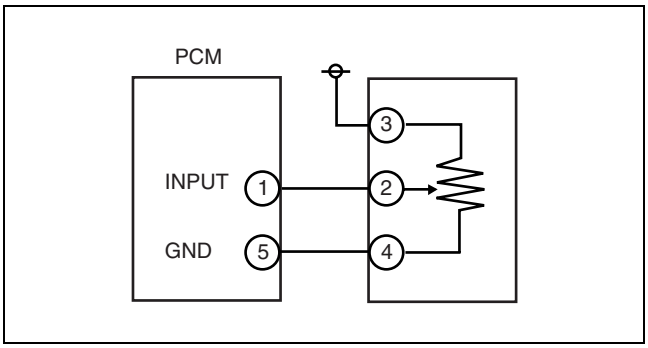
**Investigate the standard power supply system for variable resistance type 1**

- Confirm that the #3 terminal is at **5 V**.
  - — If the measured voltage on the #3 terminal is**5 V**, inspect the following points on the sensor connector.
  - — If there is no problem, inspect for the following:
    - Female terminal opening loose
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
  - — If the #3 terminal measures other than **5 V**, inspect for the following:
    - Open or short circuit in wiring harness
    - Wiring harness/pin crimp is loose or disconnected.

**Investigate the ground system for variable resistance type 1**

- Confirm that terminal sensor #5 is at **0 V**.
  - — If it is at**0 V**, inspect the sensor.
    - If necessary, replace the sensor.
  - — If not, inspect for the following:
    - Open or short circuit in wiring harness
    - Female terminal opening is loose causing an open or short circuit in wiring harness
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Wiring harness/pin crimp is loose or disconnected.

**Variable resistance type 2 (fuel tank level sensor and mass air flow (MAF) sensor)**

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**Investigate the ground system for variable resistance type 2**

- Confirm that terminal sensor #4 is at **0 V**.
  - — If it is at **0 V**, inspect the sensor.
    - If necessary, replace the sensor.
  - — If not at **0 V**, inspect for the following:
    - Open circuit in wiring harness
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Wiring harness/pin crimp is loose or disconnected.

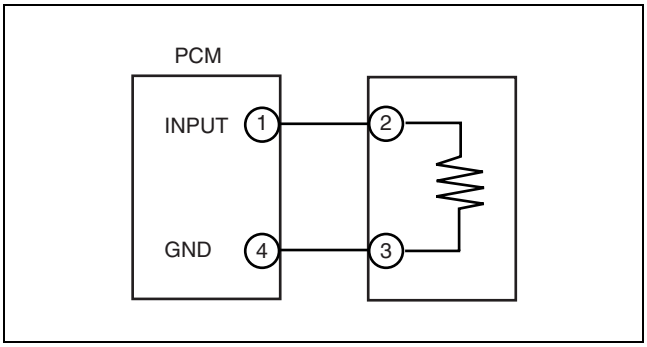
**Investigate the input signal system for variable resistance type 2**

1. When an unusual signal is received, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the M-MDS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect for the following points concerning the PCM connector:
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Wiring harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and M-MDS voltages, inspect the wiring harness for open or short circuits.
   - If the sensor and M-MDS voltages are the same, inspect the following points concerning the sensor connector:
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Wiring harness/pin crimp is loose or disconnected.
   - If there are no problems, proceed to next investigation below.

**Investigate the electrical supply system for variable resistance type 2**

- Confirm that the sensor #3 terminal is **B+**.
  - — If the measured voltage on the #3 terminal is **B+**, inspect the following points on the sensor connector.
  - — If there is no problem, inspect for the following:
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
  - — If the #3 terminal measures other than **B+**, inspect the following:
    - Open or short circuit in wiring harness
    - Wiring harness/pin crimp is loose or disconnected.

**Thermistor type (IAT sensor and ECT sensor)**

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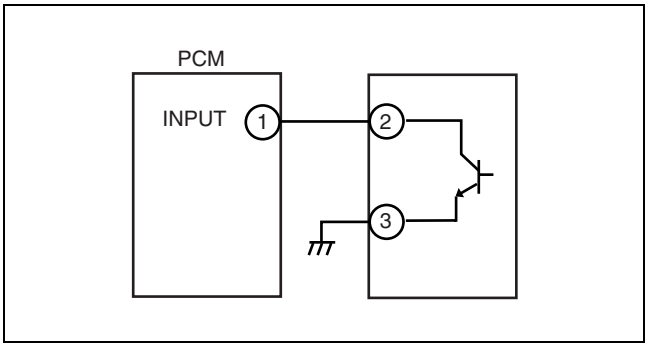
**Investigate the input signal system for thermistor type**

1. When an unusual signal is received, measure the #1 PCM terminal voltage.
   - If the #1 terminal voltage and the M-MDS monitor voltage are the same, proceed to the next step.
   - If there is a difference of **0.5 V or more**, inspect the following points concerning the PCM connector:
     - — Female terminal opening loose
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Wiring harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage.
   - If there is a **0.5 V or more** difference between the sensor and M-MDS voltages, inspect the wiring harness for open or short circuits.
   - If the sensor and M-MDS voltages are the same, inspect the following points concerning the sensor connector:
     - — Female terminal opening is loose.
     - — Coupler (pin holder) damage
     - — Pin discoloration (blackness)
     - — Wiring harness/pin crimp is loose or disconnected.
   - If there are no problems, proceed to next investigation below.

**Investigate the ground system for thermistor type**

- Confirm that terminal sensor #3 is at **0 V**.
  - — If it is at **0 V**, inspect the sensor. If necessary, replace the sensor.
  - — If not, inspect for the following:
    - Open circuit in wiring harness
    - Female terminal opening is loose.
    - Coupler (pin holder) damage
    - Pin discoloration (blackness)
    - Wiring harness/pin crimp is loose or disconnected.

**VSS**

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1. Measure the #1 PCM terminal voltage and confirm that it is at **0 V** or **5 V** when the ignition switch to the ON position and the engine is idling.
   - If it is at **0 V** or **5 V**, intermittent concern exists. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].)
   - If not, inspect the following points concerning the PCM connector.
   - If there is no problem, inspect for the following:
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Wiring harness/pin crimp is loose or disconnected.
2. Measure the #2 sensor terminal voltage and confirm that it is at **0 V** or **5 V** when the ignition switch to the ON position and the engine is idling.
   - If it is at **0 V** or **5 V**, intermittent concern exists. (See01-03-76 INTERMITTENT CONCERN TROUBLESHOOTING[L3 WITH TC].)
   - If not, inspect the following points concerning the sensor connector:
   - If there is no problem, inspect for the following.
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Wiring harness/pin crimp is loose or disconnected.
3. Confirm that the #3 terminal switch voltage is at **0 V**.
   - If it is at **0 V**, inspect the sensor. If necessary, replace the sensor.
     — If necessary, replace the sensor.
   - If not, inspect for the following:
     — Open circuit in wiring harness
     — Female terminal opening is loose.
     — Coupler (pin holder) damage
     — Pin discoloration (blackness)
     — Wiring harness/pin crimp is loose or disconnected.

**Main Relay Operation Inspection**

1. Verify that the main relay clicks when the ignition switch is turned to ON position and then off.
   - If there is no operation sound, inspect the following:
     — Main relay (See09-21-4 RELAY INSPECTION.)
     — Wiring harness and connector between ignition switch and main relay terminal A.
     — Wiring harness and connector between PCM terminal 1AT and main relay terminal B.

**Intake Manifold Vacuum Inspection**

1. Verify air intake hoses are installed properly.
2. Start the engine and run it is idling.
3. Disconnect the vacuum hose between the intake manifold and purge solenoid valve from the intake manifold side.
4. Connect a vacuum gauge to the intake manifold and measure the intake manifold vacuum.
   - If not as specified, inspect the following:

**Specification**
**More than 60 kPa {450 mmHg, 18 inHg}**

**Note**
- Air suction can be located by the engine speed change when lubricant is sprayed on the area where suction is occurring.
  — Air suction at throttle body, charge air cooler, intake manifold and PCV valve installation points
  — EGR valve (stuck open)
  — Engine compression
  (See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)

**Electronic Throttle Control System Inspection**
**Engine coolant temperature compensation inspection**

1. Connect the M-MDS to the DLC-2.
2. Select the following PIDs:
   - ECT
   - IAT
   - RPM
3. Verify that the engine is cold, then start the engine.
4. Verify that the engine speed decreases as the engine warms up.
   - If the engine speed does not decrease or decreases slowly, inspect the following:
     — ECT sensor and related wiring harness
     (See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)
     — Electronic throttle body and related wiring harness
     (See01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC].)

**Load compensation inspection**

1. Start the engine and run it is idling.
2. Connect the M-MDS to the DLC-2.
3. Verify that DTC P0506 or P0507 is not displayed.
   - If DTC P0506, or P0507 is displayed, perform the DTC inspection.
   (See01-02-13 DTC TABLE[L3 WITH TC].)
4. Select the RPM PID.

**Note**
- Excludes temporary idle speed drop just after the loads are turned on.

5. Verify that the engine speed is within the specification under each load condition.
   - If the load condition is not as specified, inspect the following:
     — A/C switch and related wiring harness
     (See07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)
     (See07-40-16 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
     — Fan switch and related wiring harness
     (See07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)
     (See07-40-16 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)
     — PSP switch and related wiring harness
     (See01-40-22 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION[L3 WITH TC].)

**Engine speed**

| Load condition | Engine speed (rpm) | |
|---|---|---|
| | P, N position | D position |
| No load | 650— 750 | 575— 675 |
| E/L operating*1 | 650— 750 | 600— 700 |
| P/S operating | 650— 750 | 650— 750 |
| A/C operating | 650— 750 | 650— 750 |

*1 : When the following electrical loads are on: Headlights, rear defroster, cooling fan No.1, cooling fan No.2, and the blower motor (2-step or more.)

**Throttle position (TP) sweep inspection**

1. Connect the M-MDS to the DLC-2.
2. Reform the KOER self-test function.
   (See01-02-10 KOEO/KOER SELF TEST[L3 WITH TC].)
3. Verify that none of the following DTCs are displayed:
   - P0122, P0123, P0222, P0223, P2100, P2101, P2102, P2103, P2107, P2108, P2119, P2122, P2123, P2127, P2128, P2135, P2138
     — If any one DTC is displayed, perform the DTC inspection.
4. Access the TP_REL PID.
5. Verify that the PID reading is within the CTP value. (See01-40-6 PCM INSPECTION[L3 WITH TC].)
   - If the PID reading is out of range, perform the following:
     — Remove the air duct from the throttle valve body.
     — Verify that the throttle valve opens when the accelerator pedal is depressed.
       - If the throttle valve opens, inspect the throttle position sensor and the related wiring harness.
       - If the throttle valve does not open, inspect the throttle actuator control motor and the related wiring harness.
6. Gradually depress the throttle pedal and verify that the PID reading increases lineally.
   - If the PID reading drops momentarily, inspect the following:
     — Throttle position sensor
7. Fully depress the throttle pedal and verify that the PID reading is within the WOT value. (See01-40-6 PCM INSPECTION[L3 WITH TC].)
   - If the PID reading is out of range, perform the following:
     — Remove the air duct from throttle valve body with connector connected.
     — Verify that the throttle valve opens when throttle pedal is depressed.
       - If the throttle valve opens, inspect the throttle position sensor and the related wiring harness.
       - If the throttle valve does not open, inspect the throttle actuator control motor and the related wiring harness.

**Variable Swirl System Operation Inspection**

1. Connect the M-MDS to the DLC-2.
2. Access the ECT PID.
3. Verify that the ECT PID is **below 60°C {140°F}**.
4. Start the engine.
5. Inspect the rod operation under the following conditions:

**Rod operation**

| **Engine speed** | 3,750 rpm | |
|---|---|---|
| | Below | Above |
| **Shutter valve actuator** | Operate | Not operate |

**If the rod operation is not specified, inspect as follows:**

1. Perform the KOER self-test using the M-MDS and verify that DTCs No. P2004, P2006, P2009 or P2010 are not displayed.
   - If DTC No. P2004, P2006, P2009 or P2010 are displayed, perform DTC inspection.
     (See01-02-13 DTC TABLE[L3 WITH TC].)

**If simulation function of M-MDS is used:**

1. Turn the ignition switch to the ON position. (Engine off)
2. Turn the variable swirl solenoid valve from off to on using the IMRC PID and verify that the operation sound of the solenoid valve is heard.
   - If the operation sound is not heard, replace the variable swirl solenoid valve.
     (See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].)
   - If the operation sound is not heard, inspect the following:
     — Vacuum hose and vacuum chamber for looseness or damage
     — Shutter valve actuator
       (See01-13-13 VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION[L3 WITH TC].)
     — Check valve is stuck open or closed
     — Shutter valve cannot move smoothly

**If simulation function of M-MDS is not used:**

1. Inspect variable swirl solenoid valve.
   (See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].)
   - If the variable swirl solenoid valve is not normal, replace the variable swirl solenoid valve.
   - If the variable swirl solenoid valve is normal, inspect the following:
     — Vacuum hose and vacuum chamber for looseness or damage
     — Shutter valve actuator
       (See01-13-13 VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION[L3 WITH TC].)
     — Check valve is stuck open or closed
     — Shutter valve cannot move smoothly

**Fuel Injector Operation Inspection**
**If simulation function of M-MDS is used:**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Start the engine and warm it up until normal operating temperature.<br>Connect the M-MDS to DLC-2.<br>Select the INJ#1, INJ#2, INJ#3, and INJ#4 PIDs.<br>Turn the fuel injector from on to off using the PIDs for each cylinder.<br>Does the engine speed drop? | Yes | Fuel injector work properly |
| | | No | **Engine speed does not drop an any cylinder:**<br>Go to the next steps.<br>**Engine speed drops on some cylinders:**<br>Go to step 3. |
| 2 | Perform the Main Relay Operation Inspection. (See01-03-81 Main Relay Operation Inspection.)<br>Does the main relay work properly? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning parts. |
| 3 | Inspect the fuel injector of the suspected cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Is the fuel injector normal? | Yes | Inspect the following for the suspected cylinder.<br>• Fuel injector power and/or ground systems related wiring harness and connectors.<br>If all items normal replace the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Replace the fuel injector.<br>(See 01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 4 | Perform KOER self-test function using the M-MDS.<br>(See01-02-10 KOEO/KOER SELF TEST[L3 WITH TC].)<br>Are DTCs P0201, P0202, P0203 and/or P0204 present? | Yes | Go to the appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 5 | Inspect the fuel injector of the suspected cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Is the fuel injector normal? | Yes | Inspect the following for the suspected cylinder:<br>• PCM terminals (pulled-out pins, corrosion)<br>• Fuel injector terminals (pulled-out pins, corrosion)<br>If all items are normal replace the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Replace the fuel injector.<br>(See 01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |

**If simulation function of M-MDS is not used:**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Perform the KOER self-test function using the M-MDS.<br>(See01-02-10 KOEO/KOER SELF TEST[L3 WITH TC].)<br>Are DTCs P0201, P0202, P0203 and/or P0204 present? | Yes | Go to appropriate DTC test.<br>(See01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 2 | Inspect the fuel injector for each cylinder.<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].)<br>Is the fuel injector normal? | Yes | Go to the next step. |
| | | No | Replace the fuel injector.<br>(See 01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 3 | Inspect the following for the suspected cylinder:<br>• Fuel injector power and/or ground system related wiring harnesses and connectors.<br>• PCM terminals (pulled-out pins, corrosion)<br>• Fuel injector terminals (pulled-out pins, corrosion)<br>Are all items normal? | Yes | Replace the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) |
| | | No | Repair or replace malfunctioning parts. |

**Fuel Cut Control System Inspection**

**Note**
- This inspection has to be performed after the Fuel Injector Operation Inspection.

**If simulation function of M-MDS is used:**
1. Warm up the engine and idle it.
2. Connect the M-MDS to the DLC-2.
3. Select the RPM and the FUELPW1 PIDs.
4. Monitor both PIDs while performing the following steps.
   (1) Depress the accelerator pedal and increase the RPM PID to **4,000 rpm**.
   (2) Quickly release the accelerator pedal (brake pedal is not depressed) and verify that the FUELPW1 PID is **0 msec.**, and **2— 5 msec**. when the RPM PID drops **below 1,200 rpm**.
   - If not as specified, inspect the following.
     — ECT sensor and related wiring harness
     (See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)

**If simulation function of M-MDS is not used:**
1. Warm up the engine and idle it.
2. Measure the fuel injector control signal wave profile using the oscilloscope while performing the following steps.
   (1) Depress the accelerator pedal and increase the engine speed to **4,000 rpm**.
   (2) Quickly release the accelerator pedal (brake pedal is not depressed) and verify that the wave profile constant**B+**, and the wave appears when the engine speed drops **below 1,200 rpm**.
   (See01-40-6 PCM INSPECTION[L3 WITH TC].)
   - If not as specified, inspect the following.
     — ECT sensor and related wiring harness
     (See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].)

**Fuel Pump Operation Inspection**
**If simulation function of M-MDS is not used:**
1. Connect the M-MDS to the DLC-2.
2. Remove the fuel-filler cap.
3. Turn the ignition switch to the ON position.
4. Turn the fuel pump relay from off to on using the FP PID and inspect if the operation sound of the fuel pump is heard.
   - If no operation sound is heard, proceed to the next step.
5. Measure the voltage at the wiring harness side fuel pump connector terminal B with the FIP PID turned on.
   - If the voltage is as specified, inspect the following:
     — Fuel pump continuity
     — Fuel pump ground
     — Wiring harness between the fuel pump relay and PCM terminal 1H
   - If not as specified, inspect the following:
     — Fuel pump relay
     — Fuel pump speed control relay
     — Wiring harness connector (Main relay—fuel pump relay—fuel pump resister—fuel pump.)

**Specification**
**8.0— 11.5 V (Ignition switch at ON)**

**If simulation function of M-MDS is not used:**

**Caution**
- **Connecting the wrong check connector terminal may possibly cause a malfunction. Carefully connect the specified terminal only.**

1. Short the check connector terminal F/P to body ground using a jumper wire.
2. Remove the fuel-filler cap.
3. Turn the ignition switch to the ON position.
4. Verify that the fuel pump operation sound is heard.
   - If no operation sound is heard, proceed to the next step.

5. Measure the voltage at wiring harness side fuel pump connector terminal B.
   - If the voltage is as specified, inspect the following:
     — Fuel pump continuity
     — Fuel pump ground
     — Wiring harness between the fuel pump relay and PCM terminal, 1H
   - If not as specified, inspect the following:
     — Fuel pump relay
     — Fuel pump speed control relay
     — Wiring harness connector (Main relay—fuel pump relay—fuel pump resister—fuel pump.)

**Specification**
**8.0— 11.5 V (Ignition switch at on)**

**Fuel Pump Control System Inspection**
**If simulation function of M-MDS is used:**
1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Select the FP PID.
4. Turn the fuel pump relay from off to on and inspect if the operation sound of the fuel pump relay is heard.
   - If no operation sound is heard, inspect the fuel pump relay.
   - If the fuel pump relay is normal, inspect the following:
     — Wiring harness and connectors (Main relay—fuel pump relay—PCM terminal 1H)

**If simulation function of M-MDS is not used:**
1. Crank the engine and verify that the fuel pump relay operation sound is heard.
2. If the operation sound is not heard, inspect the following:
   - Fuel pump relay
   - Wiring harness and connectors (Main relay—fuel pump relay—PCM terminal 1H)

**Fuel Pump Speed Control Inspection**
**If simulation function of M-MDS is used:**
1. Perform the Fuel Pump Operation Inspection.
2. Connect the M-MDS to the DLC-2.
3. Turn the ignition switch to the ON position.
4. Turn the fuel pump speed control relay from off to on using the FPRR PID and verify that the fuel pump speed control relay operation sound is heard.
   - If the operation sound is not heard, inspect the following:
     — Fuel pump speed control relay
     — Wiring harness and connectors (Main relay—fuel pump speed control relay—PCM terminal 1AA)
5. Start the engine and run it is idling.
6. Remove the fuel-filler cap.
7. Turn the fuel pump speed control relay from off to on using the FPRR PID and inspect if the operation sound frequency of the fuel pump is higher than when the FPRR PID is off.
   - If it cannot be verified, inspect the following:
     — Fuel pump resister
     — Wiring harness and connectors (open circuit at fuel pump speed control relay terminal C—fuel pump relay terminal D)

**If simulation function of M-MDS is not used:**
1. Perform the fuel pump operation inspection.
2. Verify that fuel pump relay operation sound is heard, while cranking the engine.
   - If the operation sound is not heard, inspect the following:
     — Fuel pump relay
     — Wiring harnesses and connectors (Main relay— fuel pump relay— PCM terminal 1H)
3. Remove the fuel-filler cap.
4. Verify that the fuel pump unit operation sound frequency at cranking is higher than during idle.
   - If it cannot verified, inspect for the following:
     — Fuel pump resister
     — Fuel pump relay
     — Wiring harnesses and connectors (open circuit at fuel pump relay terminal C— fuel pump terminal B)

**Spark Test**

1. Disconnect the fuel pump relay.
2. Verify that each ignition coil and connector is connected properly.
3. Inspect the ignition system in the following procedure.

**Warning**

- **High voltage in the ignition system can cause strong electrical shock which can result in serious injury. Avoid direct contact to the vehicle body during the following spark test.**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Disconnect the ignition coil from the spark plugs.<br>• Remove the spark plugs.<br>• Verify that the spark plugs do not have carbon deposits.<br>• Are the spark plugs normal? | Yes | Go to the next step. |
| | | No | Perform no-load racing at 4,000 rpm for 2 min, 2 times to burn off the carbon deposits.<br>Repeat Step 1. |
| 2 | • Inspect the spark plugs for damage, wear, and proper plug gap.<br>• Are the spark plugs normal? | Yes | Go to the next step. |
| | | No | Replace spark plugs, then go to the next step. |
| 3 | • Reconnect the spark plugs to the ignition coil.<br>• Ground the spark plugs to the engine.<br>• Is a strong blue spark visible at each cylinder while cranking the engine? | Yes | Ignition system is normal. |
| | | No | **Some cylinders do not spark:**<br>• Go to the next step.<br>**All cylinders do not spark:**<br>• Go to Step 5. |
| 4 | • Inspect the following wiring harnesses for an open or short circuit:<br>— Ignition coil No.1 terminal C—PCM terminal 2BA<br>— Ignition coil No.2 terminal C—PCM terminal 2AW<br>— Ignition coil No.3 terminal C—PCM terminal 2AX<br>— Ignition coil No.4 terminal C—PCM terminal 2AT<br>• Are the wiring harnesses normal? | Yes | Inspect and replace the ignition coil.<br>(See01-18-2 IGNITION COIL INSPECTION[L3 WITH TC].) |
| | | No | Repair or replace the malfunctioning part, then go to Step 1. |
| 5 | • Measure the voltage at terminal A in each ignition coils.<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Inspect the power supply circuit of ignition coils. |
| 6 | • Does the PCM connector or ignition coil connectors have poor connection? | Yes | Repair or replace the connector, then go to Step 1. |
| | | No | Go to the next step. |
| 7 | • Are the following parts normal?<br>— CKP sensor and crankshaft pulley | Yes | Inspect for an open or short circuit in the wiring harness and connector of the CKP sensor. |
| | | No | Repair or replace the malfunctioning part, then go to Step 1. |

**EGR Control System Inspection**

**If simulation function of M-MDS is used:**

1. Crank the engine and verify that the EGR valve operation (initial operation) sound is heard.
   - If the operation sound is not heard, connect the M-MDS to the DLC-2 and verify that the DTC P0403 is shown. Perform the DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].)
2. Start the engine run it is idling.
3. Increase the step value of the EGR valve from **0 to 57** using the SEGR PID of the simulation function.
4. Operate the EGR valve and inspect if the engine speed becomes unstable or the engine stalls.
   - If the engine speed does not change, proceed to the following.
   (1) Stop the engine.
   (2) Remove the EGR valve.
   (3) Connect the EGR valve connector.
   (4) Turn the ignition switch to the ON position.
   (5) Increase the step value of EGR valve from **0 to 57** using SEGRP PID.
   (6) Verify that the EGR valve operates according to the SEGRP PID.
      - If the EGR valve is operated, clean the EGR valve and the EGR gas passage.
      - If the EGR valve does not operate, replace the EGR valve.
5. Start the engine and warm it up completely.
6. Access the following PIDs.
   - ECT, RPM, SEGRP, APP1, APP2, TP_REL, VSS
7. Idle the vehicle and verify that the SEGRP value is **0**.

8. Put the vehicle in drive.
9. Depress the accelerator pedal and verify that the SEGRP value increases.
   - If the SEGRP value does not increase, inspect the VSS, TP and ECT PIDs. (See01-40-6 PCM INSPECTION[L3 WITH TC].)
10. Stop the vehicle and verify that the SEGRP value is returns to **0**.

**If simulation function of M-MDS is not used:**

1. Verify that EGR valve operation (initial operation) sound is heard when the ignition switch is turned to the ON position.
   - If the operation sound is not heard, connect the M-MDS to the DLC-2 and verify that the DTC P0403 is shown. Perform the DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].)
2. Start the engine and idle it.
3. Warm up the engine to normal operating temperature.
4. Select the following PIDs:
   - ECT, RPM, SEGRP, APP1, APP2, TP_REL, VSS
5. Let the vehicle idle and verify that the SEGRP value is **0**.
6. Put the vehicle in drive.
7. Depress the accelerator pedal and verify that the SEGRP value is increased.
   - If the EGR valve increases, inspect the following:
     — EGR valve (stuck open or closed)
     — Wiring harness and connectors (Main relay—EGR valve—PCM)
   - If the SEGRP value does not increase, inspect the VSS, APP1, APP2, TP_REL and ECT PIDs. (See01-40-6 PCM INSPECTION[L3 WITH TC].)
8. Stop the vehicle and verify that the SEGRP value returns to **0**.

**Purge Control System Inspection**
**If simulation function of M-MDS is used:**

1. Start the engine.
2. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
3. Put a finger to the purge solenoid valve and verify that there is no vacuum applied when the engine is cold.
   - If there is a vacuum, inspect the following:
     — Wiring harness and connectors (Purge solenoid valve—PCM terminal 2AB)
     — Purge solenoid valve (stuck open)
4. Connect the M-MDS to the DLC-2 and verify that the DTC P0403 is displayed. Perform the DTC inspection. (See01-02-133 DTC P0403[L3 WITH TC].)
5. Select the EVAPCP PID.
6. Increase the duty value of the purge solenoid valve to **50%** and inspect if the operation sound of the valve is heard.
   - If the operation sound is heard, inspect for loose or damaged vacuum hoses. (Intake manifold—purge solenoid valve—charcoal canister)
   - If the operation sound is not heard, perform the purge solenoid valve inspection. (See01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC].)
7. Warm up the engine to normal operating temperature.
8. Monitor the EVAPCP PID using the M-MDS, and drive the vehicle **approx. 2000 rpm** for **30 s or more**.
   - If the EVAPCP PID is **0%**, inspect the following.
     — MAF, APP1, APP2, TP_REL and LOAD PIDs.

**If simulation function of M-MDS is not used:**

1. Start the engine.
2. Disconnect the vacuum hose between the purge solenoid valve and the charcoal canister.
3. Put a finger to the purge solenoid valve and verify that there is no vacuum applied when the engine is cold.
   - If there is vacuum, inspect the following:
     — Wiring harness and connectors (Purge solenoid valve—PCM terminal, 2AB)
     — Purge solenoid valve
4. Warm up the engine to the normal operating temperature.
5. Stop the engine.
6. Connect the M-MDS to the DLC-2 and verify that the DTC P0443 is shown. Perform DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].)
7. Turn the ignition switch to the ON position.
8. Select the ECT PID.
9. Verify that the engine coolant temperature is **above 60°C {140°F}**.
   - If the M-MDS indicates that the temperature is **below 60°C {140°F}**, perform the ECT sensor inspection.

10. Set the vehicle on the dynamometer or chassis roller.

**Warning**
- **When the dynamometer or chassis roller is operating, there is a possibility that the operator may come into contact with or be caught up in the rotating parts, leading to serious injuries or death. When performing work while the dynamometer or chassis roller is operating, be careful not to contact or be caught up in any of the rotating parts.**



11. Drive vehicle at an engine speed to **approx. 2000 rpm** for **30 s or more**.
12. Put a finger to the purge solenoid valve and verify that there is no vacuum applied during Step 2.
    - If there is no vacuum, inspect the following:
      — Wiring harness and connector (Main relay—purge solenoid valve—PCM terminal 2AB)
      — Purge solenoid valve
      — MAF, APP1, APP2, TP_REL and LOAD PIDs
    - If there is vacuum, inspect the following:
      — Vacuum hose (Purge solenoid valve—charcoal canister)

**A/C Cut-off Control System Inspection**
1. Start the engine.
2. Turn the A/C switch and fan switch on.
3. Verify that the A/C compressor magnetic clutch actuates.
   - If it does not actuate, go to symptom troubleshooting “No.23 A/C does not work sufficiently“.
4. Fully open the throttle valve and verify that the A/C compressor magnetic clutch does not actuate for **2— 5 s**.
   - If it actuates, inspect as follows:
     — A/C relay
     — Open or short to ground circuit in the wiring harness and connectors (Ignition switch—A/C relay—PCM terminal 1I)
     — A/C related parts
     — APP1, APP2 PIDs

**Cooling Fan Control System Inspection**
1. Connect the M-MDS to the DLC-2.
2. Start the engine and warm it up to normal operating temperature.
3. Perform the KOER self-test.
   (See01-02-10 KOEO/KOER SELF TEST[L3 WITH TC].)
4. Verify that the DTC P0480 is not shown and the cooling fan operates during the KOER self-test.
   - If DTC P0480 is shown, perform the DTC troubleshooting procedure.
     (See01-02-152 DTC P0480[L3 WITH TC].)
   - If the cooling fans do not operate, proceed to the following:

   (1) Verify the clicking sound of the cooling fan relay when the ignition switch is turned from the off to the ON position.
   (2) If there is no the clicking sound, inspect the cooling fan relay for an open circuit between the ignition switch and the cooling fan relay.
       - If there is a clicking sound, go to the next step.
       - Inspect the following parts in the indicated order in accordance with fan operation conditions.

**Cooling fans do not operate**
— Open circuit between the fan control module and the cooling fan relay
— Open circuit between fan control module and ground
— Poor connection of the fan control module connector
— Fan control module
(See01-12-14 FAN CONTROL MODULE INSPECTION[L3 WITH TC].)

**Cooling fan motor No.1 does not operate**
— Open or short to ground circuit between the fan control module and cooling fan motor No.1
— Poor connection of the fan control module connector or cooling fan motor No.1 connector
— Cooling fan motor No.1
(See01-12-14 FAN MOTOR INSPECTION[L3 WITH TC].)
— Fan control module
(See01-12-14 FAN CONTROL MODULE INSPECTION[L3 WITH TC].)

**Cooling fan motor No.2 does not operate**
— Open or short to ground circuit between the fan control module and the cooling fan motor No.2
— Poor connection of the fan control module connector or the cooling fan motor No.1 connector
— Cooling fan motor No.2
(See01-12-14 FAN MOTOR INSPECTION[L3 WITH TC].)
— Fan control module
(See01-12-14 FAN CONTROL MODULE INSPECTION[L3 WITH TC].)

**Wastegate Control System Operation Inspection**
**If simulation function of M-MDS is used:**

1. Start the engine and run it is idling.
2. Disconnect the hose between the wastegate control solenoid valve and the intake pipe.
3. Put a finger to the wastegate control solenoid valve and verify that there is no pressure applied.
   - If there is pressure, inspect the following:
     — Wiring harness and connectors (Wastegate control solenoid valve— PCM terminal 2AA)
     — Wastegate control solenoid valve (Stuck open)
4. Warm up the engine to normal operating temperature.
5. Connect the M-MDS to the DLC-2 and verify that DTC P0245 or P0246 are shown. Perform the DTC inspection.
   (See01-02-112 DTC P0245[L3 WITH TC].)
   (See01-02-114 DTC P0246[L3 WITH TC].)
6. Select the VGT PID.
7. Increase the duty value of the wastegate control solenoid valve and inspect if the operation sound of the solenoid valve is heard.
   - If the operation sound is heard, inspect for loose or damaged vacuum hoses. (Wastegate actuator—wastegate control solenoid valve—intake hose)
   - If the operation sound is not heard, perform the wastegate control solenoid valve inspection. (See01-13-14 WASTEGATE CONTROL SOLENOID VALVE INSPECTION[L3 WITH TC].)
8. Warm up the engine to normal operating temperature.
9. Monitor the VGT and APP PIDs using the M-MDS.
10. Run the engine with the APP PID **above 30%** and verify that the VGT PID value increases from **0%**.
    - If the VGT PID is **0%**, inspect the APP PID.

**If simulation function of M-MDS is not used:**

1. Start the engine and run it is idling.
2. Disconnect the hose between the wastegate control solenoid valve and the intake pipe.
3. Put a finger to the wastegate control solenoid valve and verify that there is no pressure applied.
   - If there is pressure, inspect the following:
     — Wiring harness and connectors (Wastegate control solenoid valve—PCM terminal 2AA)
     — Wastegate control solenoid valve (Stuck open)
4. Warm up the engine to normal operating temperature.
5. Connect the M-MDS to the DLC-2 and verify that the DTC P0245 or P0246 are shown. Perform the DTC inspection.
   (See01-02-112 DTC P0245[L3 WITH TC].)
   (See01-02-114 DTC P0246[L3 WITH TC].)
6. Warm up the engine to normal operating temperature.
7. Monitor the VGT and APP PIDs using the M-MDS.
8. The hose between the wastegate control solenoid valve and intake pipe is disconnected.
9. Run the engine with the APP PID **above 30%** and verify that the VGT PID value increases from **0%** and there is pressure applied.
   - If the VGT PID is **0%**, inspect the TP_REL PID.
   - If there is no pressure applied, inspect for the following:
     — Wastegate control solenoid valve (Stuck closed)
     — Hose connection (Intake hose (turbocharger compressor downstream side) —wastegate actuator— intake hose (turbocharger compressor upstream side))

**Variable Valve Timing Control System Operation Inspection**
**When idling cannot be continued**

1. Remove the oil control valve (OCV) and verify that the spool valve is at maximum retard position.
2. Connect the oil control valve (OCV).
3. Turn the ignition switch to the ON position.
4. Verify that the spool valve is at the maximum retard position.
   - If the spool valve is stuck in the advance direction, inspect for the following:
     — Short circuit in wiring harnesses or connectors between the oil control valve (OCV) and the PCM.
5. Inspect the variable timing actuator.

**When idling can be continued**
**If simulation function of M-MDS is used:**

1. Warm up the engine to normal operating temperature.
2. Connect the M-MDS to the DLC-2.
3. Start the engine and run it is idling.
4. Select the VT DUTY1 PID.
5. Increase the oil control valve (OCV) duty value and verify that the engine idles roughly or stalls.
   - If as specified, inspect the timing belt component (valve timing deviation).
   - If not as specified, go to the next step.
6. Remove the oil control valve (OCV) while the connector is connected.
7. Turn the ignition switch to the ON position.
8. Select VT DUTY1 PID.
9. Increase the oil control valve (OCV) duty value and verify that the spool valve operates in the advance direction.
   - If as specified, inspect the following hydraulic passage for clogging and/or leakage.
     — Oil pressure switch—oil control valve (OCV)
     — Oil control valve (OCV) —camshaft
     — Camshaft internal passage
   - If not as specified, inspect the following:
     — Oil control valve (OCV) operation
     — Harness and connectors for open or short circuit (Oil control valve (OCV) —PCM terminal 2AF)
10. If they are normal, replace the intake camshaft pulley (with a built-in variable valve timing actuator).

**If simulation function of M-MDS is not used:**

1. Disconnect the oil control valve (OCV) connector.
2. Warm up the engine and idle it.
3. Apply battery voltage to the oil control valve (OCV) and verify that the engine idles roughly or stalls.
   - If the engine idles roughly or stalls, inspect the timing belt component (valve timing deviation).
   - If the engine does not idle roughly or stalls, go to the next step.
4. Remove the oil control valve (OCV) and perform the spool valve operation inspection.
   (See01-10-29 OIL CONTROL VALVE (OCV) INSPECTION[L3 WITH TC].)
   - If not as specified, inspect the following:
     — Oil control valve (OCV)
     — Harnesses and connectors between oil control valve (OCV) and PCM have an open or short circuit.
   - If as specified, inspect the following hydraulic passages for clogging or leakage or both:
     — Oil pressure switch—oil control valve (OCV)
     — Oil control valve (OCV) —camshaft
     — Camshaft internal passage
5. If they are normal, replace the camshaft pulley (with built-in variable valve timing actuator).

**Evaporative Emission (EVAP) System Leak Inspection**

- To verify that the problem has been fixed properly after repairs, the run-drive cycle or EVAP system leak inspection must be performed.

**EVAP system leak inspection using the M-MDS**

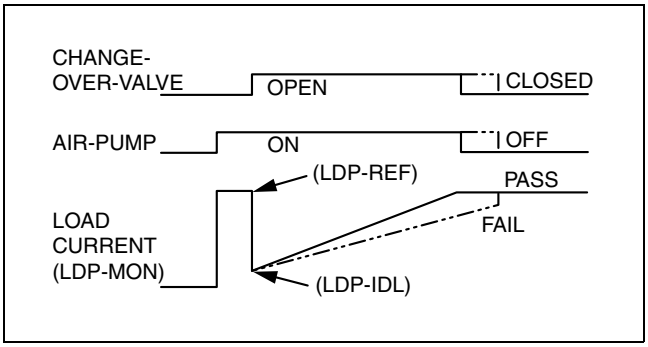
**Note**
**EVAP system test outline**

- The EVAP system test, which can substituted for the run-drive cycle as an EVAP control system repair confirmation method, can be done while operating the M-MDS in the KOEO (Key On Engine Off) condition instead of actually driving the vehicle.

**EVAP system test description**

- The EVAP system test finds gas leaks in the system using the PCM to monitor changes in the air pump load current of the EVAP system leak detection pump. This test starts after sending an on-demand test signal from the M-MDS to the PCM. The PCM controls the air pump and change-over-valve operation and also stores the load current of the air pump as follows:
  i. The PCM turns the air pump on and retrieves the air pump load current value (LDP_MON PID) as a reference current (LDP_REF PID).
  ii. After retrieving the reference current value, the PCM commands the change-over-valve to open, then captures the air pump load current value (LDP_MON PID) as the idle current (LDP_IDL PID). The EVAP system will be pressurized from this phase.

iii. The PCM continues to monitor the air pump load current value (LDP_MON PID) until the end of the test.

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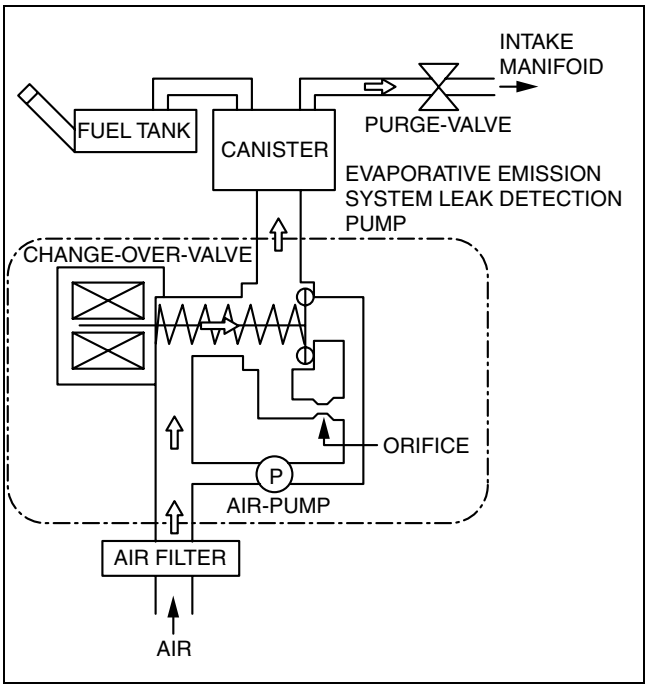
- You can confirm whether any EVAP gas leak has occurred or not by reading the test results.

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**EVAP system malfunction judgment**

- The PCM calculates the stored air pump load current value and sends the results to the M-MDS as DTCs:

| DTC No. | Condition |
|---|---|
| P0442 | EVAP control system leak detected (small leak) |
| P0446 | Change over valve (COV) (EVAP system leak detection pump) stuck closed |
| P0455 | EVAP control system leak detected (gross leak) |
| P0456 | EVAP control system leak detected (very small leak) |
| P2401 | EVAP system leak detection pump motor circuit low |
| P2402 | EVAP system leak detection pump motor circuit high |
| P2404 | EVAP system leak detection pump sensor circuit malfunction |
| P2405 | EVAP system leak detection pump sensor circuit low input |
| P2407 | EVAP system leak detection pump sensor circuit intermittent |

**Evaporative system test procedure**

1. Select the EVAP system test from the Toolbox on the M-MDS display and follow the instructions.
2. Verify that all of the following PIDs are within the specifications at the pre-test confirmation screen.

**Note**

- To successfully perform this procedure, all PIDs must be within the following specifications before proceeding to the next step.
- The PCM will cancel the EVAP system test if the B+ PID value falls lower than **11.0 V** during the test.

**Specification**

| PID | PID Range |
|---|---|
| BARO | 72.2 kPa {543 mmHg, 21.3 inHg} or more |
| FLI | 15— 85% |
| IAT | 5— 45 °C {41— 113 °F} |
| B+ | 11.0 V or more |

3. Start the engine.
4. Drive the vehicle or let the engine idle more than **20 min**.
5. Turn the ignition switch off, then turn it to the ON position again (Key On Engine Off).
6. Press the tick icon to start the test.
7. Verify that no DTCs are present after the completion of the test.

- If any test result is indicated with red, diagnose the problem using the following DTC troubleshooting procedure or component inspection procedure.
- If any DTCs are detected, diagnose the problem using the appropriate DTC troubleshooting procedure.

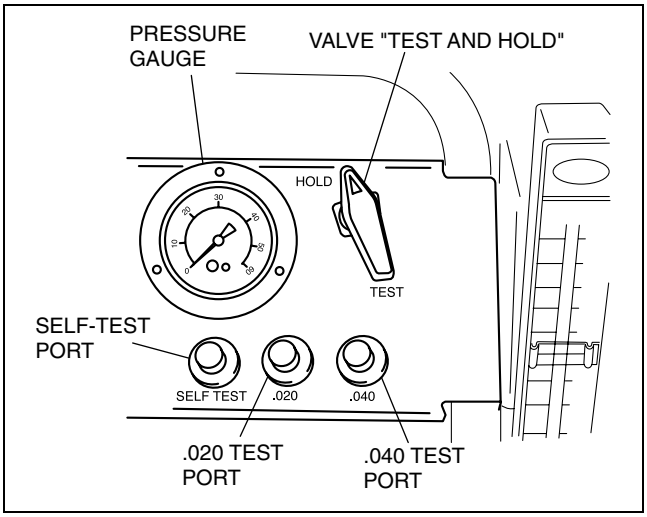
**EVAP system leak inspection using leak tester**

1. Perform the following **SST** (EVAP System Tester 134-01049) self-test:

**Note**

- If the tester does not work correctly during the self-test, refer to the tester operators manual for a more detailed self-test procedure.

(1) Verify that the control valve on the panel is in the HOLD position, then open the nitrogen bottle valve.
(2) Connect the vehicle interface hose (part of the **SST**) to the SELF TEST port located on the control panel. Hand tighten the fitting. (Do not overtighten.)
(3) Turn the control valve to the TEST position.
(4) The gauge should read **331— 381 mm {13— 15 in}** of water.
  - If the gauge is not reading in this range, adjust the pressure by turning the black knob on the low pressure regulator at the nitrogen bottle.
(5) Turn the control valve to the HOLD position.
(6) Verify that the gauge holds pressure and that the flow meter reads no flow.
  - If there is no drop in pressure and no flow, the tester passes the self-test.
  - If the gauge leaks down, refer to the operators manual.

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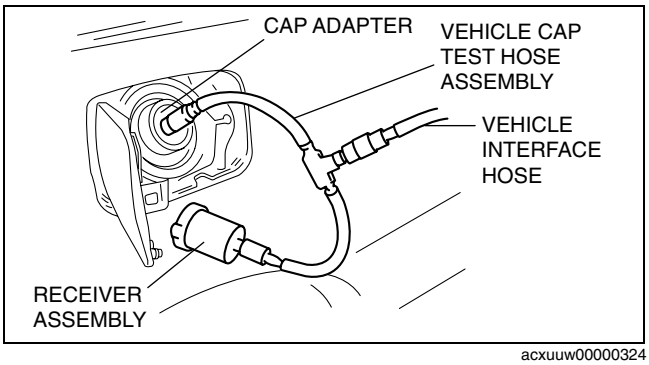
2. Connect the **SST** to the vehicle.
   (1) Verify that the control valve on the panel is in the HOLD position then open the nitrogen bottle valve.
   (2) Remove the fuel-filler cap from the vehicle.
      • If the fuel-filler cap is not a MAZDA part or equivalent, replace it.
   (3) Connect the receiver assembly (**SST**: 134-01059) to the vehicle cap test hose assembly (part of **SST**) and the fuel-filler cap from the vehicle.
   (4) Connect the cap adaptor (**SST**: 134-01058) to the vehicle cap test hose assembly (part of the **SST**) and to the fuel-filler neck.
   (5) Connect the vehicle interface hose (part of the **SST**) to the center fitting of the vehicle cap test hose assembly (part of the **SST**).



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3. Connect the M-MDS to the DLC-2.
4. Turn the ignition switch to the ON position (Engine off).
5. Request the PCM on-board device control (Mode 08) using the M-MDS to close the change-over valve (COV) in the EVAP system leak detection pump.

**Note**
- The COV is closed for **10 min** unless any of the following actions are performed:
  — The engine is started.
  — The ignition switch is turned off.

6. Make sure the control valve on the 134-01049 is in the HOLD position and that the valve on the cylinder of nitrogen gas is open.
7. Turn the control valve to the open position and let the system fill. You should note a drop in the gauge pressure along with the flow meter being pegged at maximum flow for several minutes depending on how full or empty the fuel tank is, and how long it takes to completely fill and pressurize the evaporative emissions system hoses.
8. If the gauge and the flow meter do not settle to a measurable level after **2— 3 min**, then refer to the Mazda Workshop Manual to verify that the cut or vent valve is properly closed.
9. Verify the pressure gauge and flow meter reading to determine if there is an evaporative emissions leak:
   **NO EVAPORATIVE LEAK:**
   - The flow meter registers “zero flow” and the pressure gauge returns to the pre-set pressure of **356 mm {14 in}** of water (H2O).

   **EVAPORATIVE LEAK:**
   - The pressure does not return to the preset level of **356 mm {14 in}** of water (H2O) when measuring the flow. See “SETTING LEAK STANDARD FOR TESTING” (.020 to. 040 inch H2O) of the Evaporative Emissions Tester operators manual (134-01067).

**Note**
- Turn the control valve to the HOLD position then disconnect the **SST**.

# 01-10 MECHANICAL [L3 WITH TC]

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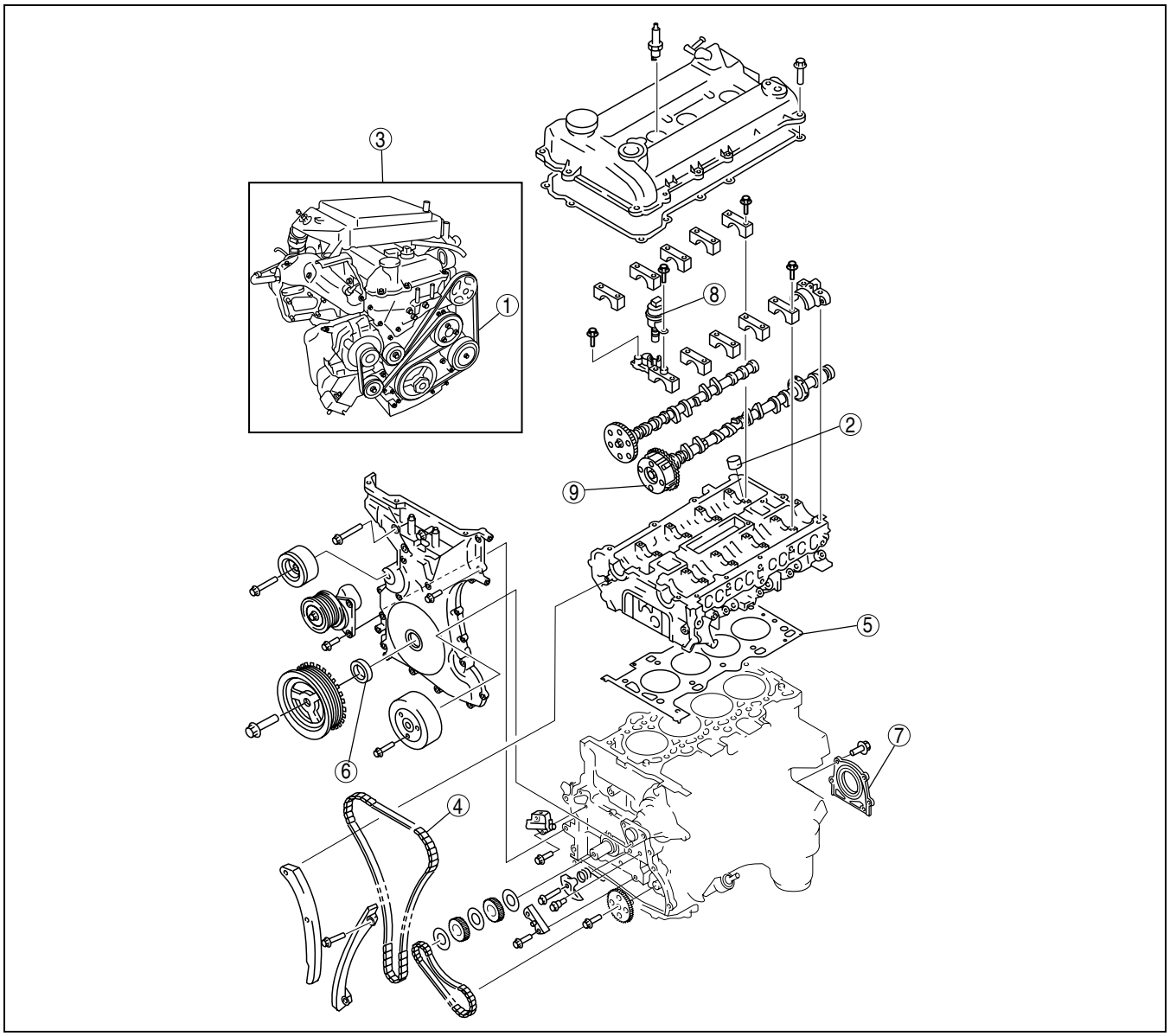


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| | |
|---|---|
| 1 | Drive belt<br>(See01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)<br>(See01-10-3 DRIVE BELT REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-10-4 DRIVE BELT AUTO TENSIONER INSPECTION[L3 WITH TC].) |
| 2 | Tappet<br>(See01-10-4 VALVE CLEARANCE INSPECTION/ ADJUSTMENT[L3 WITH TC].) |
| 3 | Engine<br>(See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)<br>(See01-10-31 ENGINE REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-10-35 ENGINE DISASSEMBLY/ ASSEMBLY[L3 WITH TC].)<br>(See01-10-35 ENGINE TUNE-UP[L3 WITH TC].) |
| 4 | Timing chain<br>(See01-10-10 TIMING CHAIN REMOVAL/ INSTALLATION[L3 WITH TC].) |

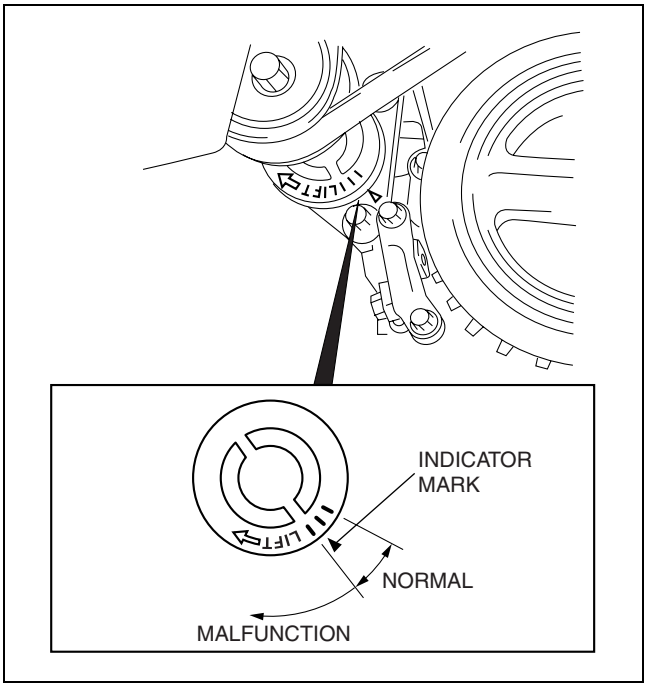
| | |
|---|---|
| 5 | Cylinder head gasket<br>(See01-10-20 CYLINDER HEAD GASKET REPLACEMENT[L3 WITH TC].) |
| 6 | Front oil seal<br>(See01-10-23 FRONT OIL SEAL REPLACEMENT[L3 WITH TC].) |
| 7 | Rear oil seal<br>(See01-10-26 REAR OIL SEAL REPLACEMENT[L3 WITH TC].) |
| 8 | OCV<br>(See01-10-29 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-10-29 OIL CONTROL VALVE (OCV) INSPECTION[L3 WITH TC].) |
| 9 | Variable valve timing actuator<br>(See 01-10-28 VARIABLE VALVE TIMING ACTUATOR INSPECTION[L3 WITH TC].)<br>(See01-10-28 VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION[L3 WITH TC].) |

## DRIVE BELT INSPECTION[L3 WITH TC]

id011039801500

**Note**
- Drive belt deflection/tension inspection is not necessary because of the use of the drive belt auto tensioner.

1. Verify that the drive belt auto tensioner indicator mark does not exceed the limit.
   - If it exceeds the limit, replace the drive belt. (See01-10-3 DRIVE BELT REMOVAL/ INSTALLATION[L3 WITH TC].)

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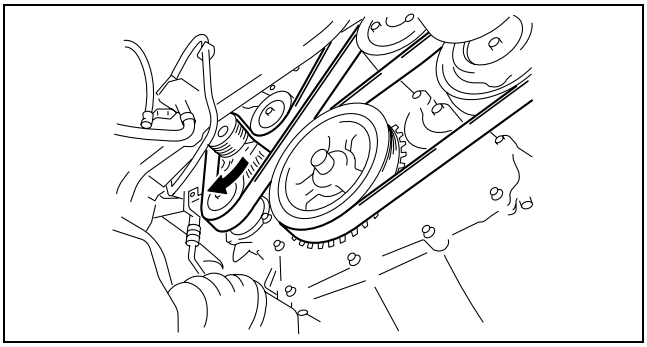
## DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC]

id011039801600

1. Remove the splash shield (RH).
2. Rotate the drive belt auto tensioner in the direction shown in the figure and remove the drive belt.
3. Install the drive belt.
4. Verify that the drive belt auto tensioner indicator mark does not exceed the limit. (See01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)
5. Install the splash shield (RH).



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## DRIVE BELT AUTO TENSIONER INSPECTION[L3 WITH TC]

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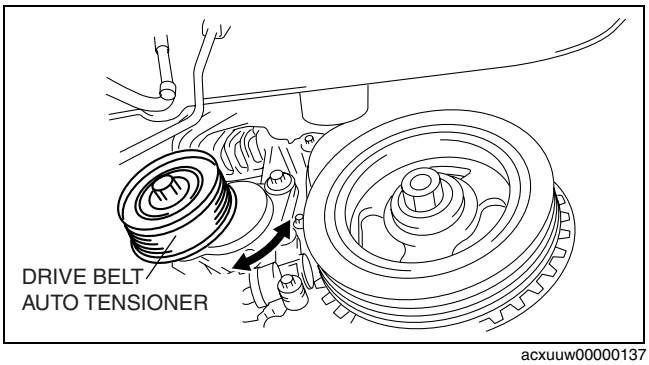
1. Remove the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
2. Verify that the drive belt auto tensioner moves smoothly in the operational direction.
   - Replace the drive belt auto tensioner if necessary.
3. Rotate the drive belt auto tensioner pulley by hand and verify that it rotates smoothly.
   - Replace the drive belt auto tensioner if necessary.
4. Install the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)

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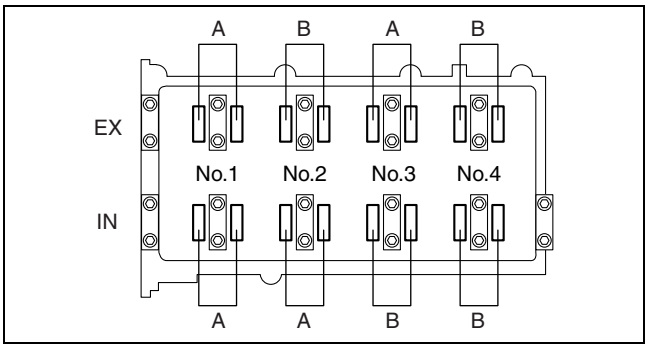
## VALVE CLEARANCE INSPECTION/ADJUSTMENT[L3 WITH TC]

id011039800200

**Valve Clearance Inspection**

1. Disconnect the negative battery cable.
2. Remove the splash shield (RH).
3. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the high pressure fuel pump. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
6. Disconnect the wiring harness.
7. Remove the ventilation hose.
8. Remove the cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
9. Measure the valve clearance.
   (1) Rotate the crankshaft clockwise so that the No.1 cylinder is at TDC of the compression stroke.
   (2) Measure the valve clearance of location A shown in the figure.

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**Standard valve clearance [Engine cold]**
**IN: 0.22— 0.28 mm {0.0087— 0.011 in}**
**EX: 0.27— 0.33 mm {0.011— 0.012 in}**

   (3) If it is not within the specification, replace the tappet and adjust the valve clearance to the median value of the standard.

**Note**
- Make sure to note down the measured values for choosing the suitable replacement tappets.

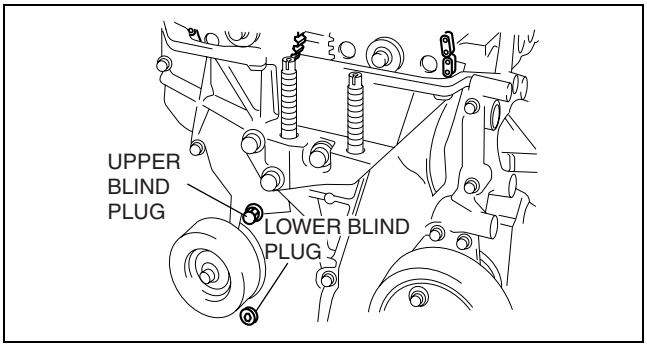
   (4) Rotate the crankshaft clockwise **360**° so that the No.4 cylinder is at TDC of the compression stroke.
   (5) Measure the valve clearance of location B shown in the figure.

**Standard valve clearance [Engine cold]**
**IN: 0.22— 0.28 mm {0.0087— 0.011 in}**
**EX: 0.27— 0.33 mm {0.011— 0.012 in}**

   (6) If not within the specification, replace the tappet and adjust the valve clearance to the median value of the standard.
10. Install the cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
11. Install the ventilation hose.
12. Connect the wiring harness.
13. Install the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
14. Install the high pressure fuel pump. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)
15. Install the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
16. Install the splash shield (RH).
17. Connect the negative battery cable.

**Valve Clearance Adjustment**

1. Disconnect the negative battery cable.
2. Remove the splash shield (RH).
3. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the high pressure fuel pump. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/ INSTALLATION[L3 WITH TC].)
5. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
6. Disconnect the wiring harness.
7. Remove the ventilation hose.
8. Remove the cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
9. Remove the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
10. Remove the engine front cover lower blind plug.
11. Remove the engine front cover upper blind plug.

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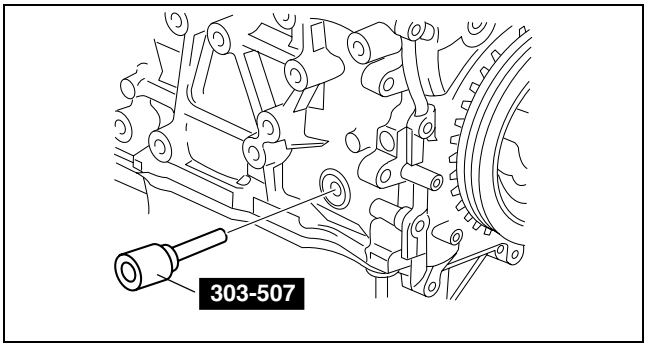
12. Remove the cylinder block lower blind plug, and install the **SST.**
13. Rotate the crankshaft in the direction of the engine rotation so that the No.1 piston is at TDC of the compression stroke. (Until the crank weight contacts **SST** and stops.)

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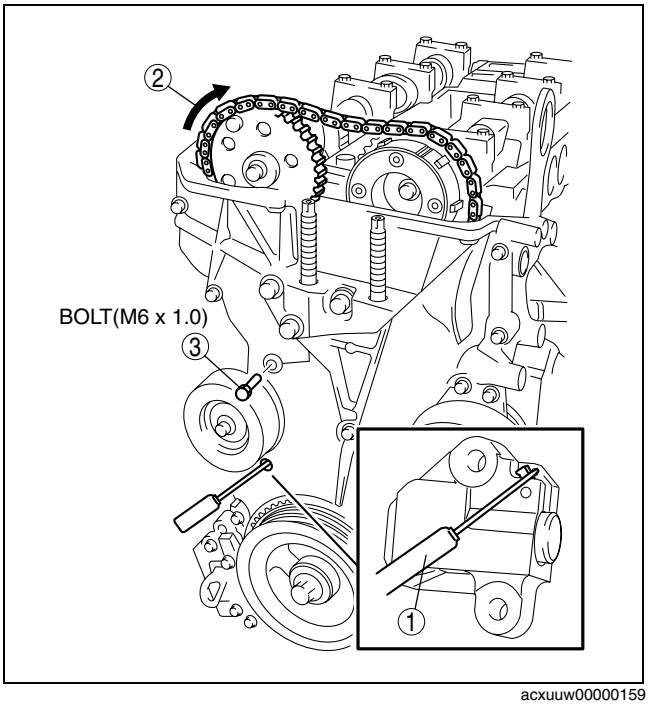
14. Release the tension on the timing chain shown in the figure.

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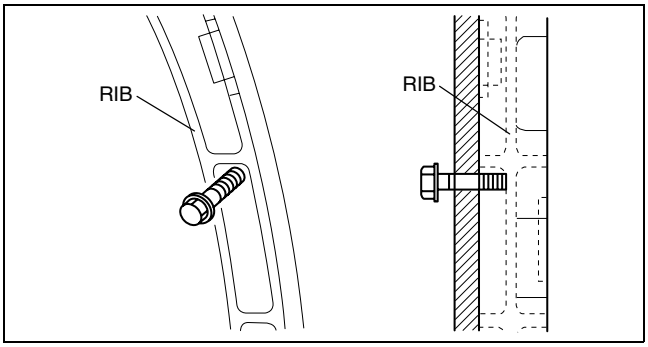
(1) Using a suitable screwdriver or equivalent tool, unlock the chain tensioner ratchet.
(2) Rotate the exhaust camshaft clockwise using a suitable wrench on the cast hexagon and loosen the tension on the timing chain.
(3) Using a suitable bolt **(M6 X 1.0 length 25mm— 35mm {0.99— 1.3 in})** at the engine front cover upper blind plug, secure the tensioner arm at the position where the tension is released.



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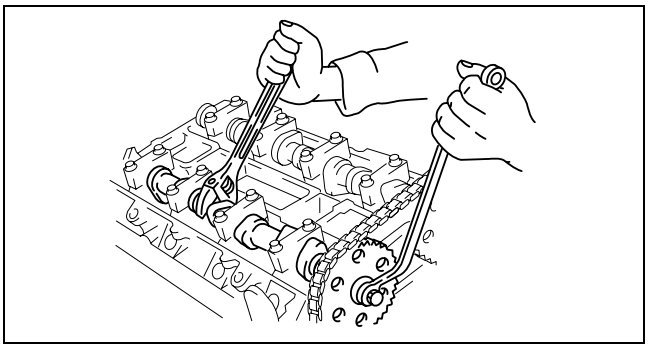
15. Fix the exhaust camshaft using a wrench on the cast hexagon, and loosen the camshaft sprocket installation bolt.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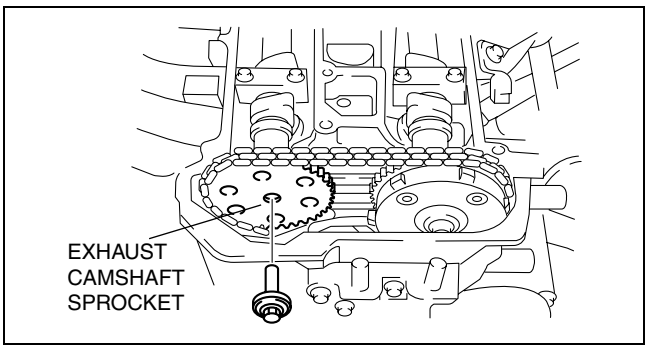
16. Remove the installation bolt and remove the exhaust camshaft sprocket.
17. Remove the oil control valve (OCV). (See01-10-29 OIL CONTROL VALVE (OCV) REMOVAL/ INSTALLATION[L3 WITH TC].)



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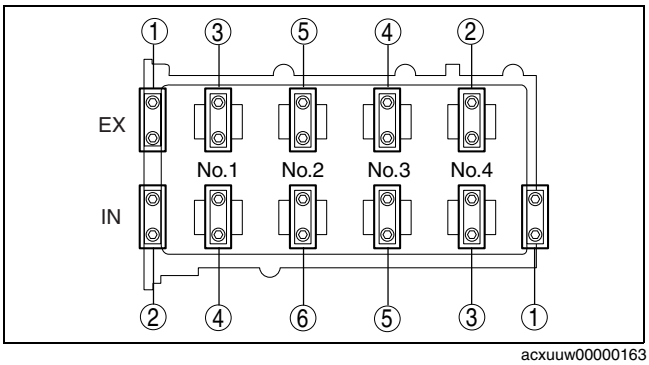
18. Loosen the camshaft cap bolts in two or three passes in the order shown in the figure and remove the camshaft cap.

**Note**
- The camshaft caps are to be kept ordered for correct reassembly in their original positions. Do not mix the caps.



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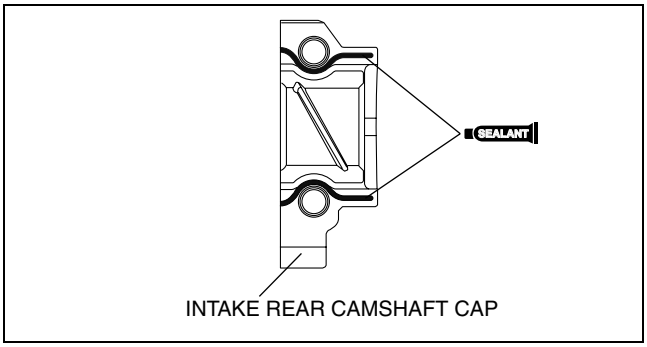
19. Remove the camshafts for the intake and exhaust sides.
20. Remove the tappet.
21. Install an appropriate tappet based on the results of the valve clearance inspection.
Selected tappet = Removed tappet thickness + Measured valve clearance - Standard valve clearance

**Standard valve clearance [Engine cold]**
**IN: 0.22— 0.28 mm {0.0087— 0.011 in}**
**EX: 0.27— 0.33 mm {0.011— 0.012 in}**

22. Install the camshaft with No.1 cylinder cam aligned at TDC of the compression stroke.

23. Carefully apply adhesive agent (Loctite 518 or 962) to the area indicated in the figure so that it does not leak into the sliding part.

**Thickness**
**1.0 mm {0.039 in}**



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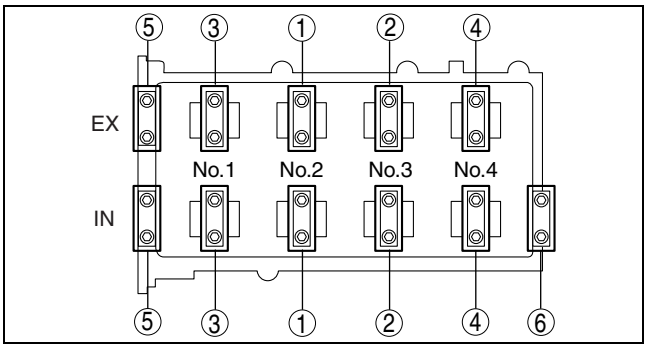
24. Install the camshaft caps and temporarily tighten the camshaft cap bolts evenly in two or three passes, and then tighten the camshaft cap bolts in two passes, using the following two steps and in the order shown in the figure.

**Tightening procedure**
1. **5.0— 9.0 N·m {51— 91 kgf·cm, 45— 79 in·lbf}**
2. **14.0— 17.0 N·m {1.5— 1.7 kgf·m, 10.4— 12.5 ft·lbf**



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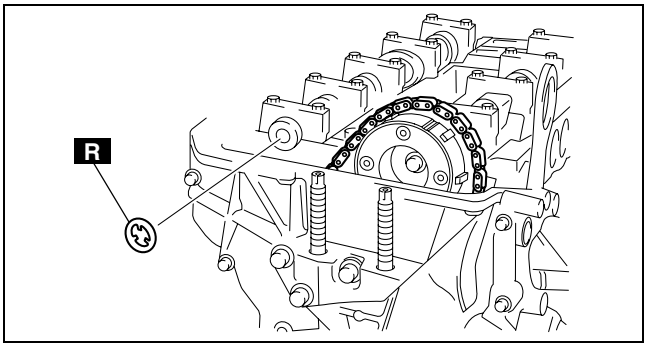
25. Install the OCV. (See01-10-29 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION[L3 WITH TC].)
26. Install a new washer.



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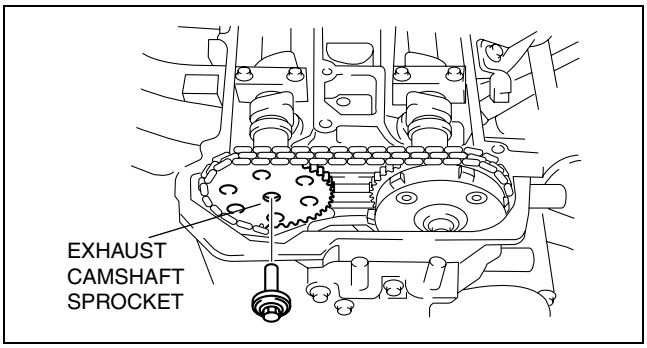
27. Install the exhaust camshaft sprocket.

**Caution**
- **Do not tighten the camshaft sprocket installation bolt at this stage. Verify the valve timing before performing the bolt tightening.**



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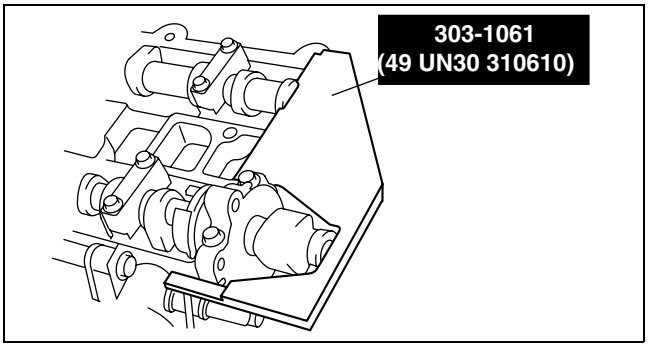
28. Install the **SST** on the camshaft as shown in the figure.
29. Remove the installation bolt for the engine front cover upper blind plug (**M6 X 1.0 length 25— 35mm {0.99— 1.3 in}**), and apply tension to the timing chain.
30. Rotate the crankshaft clockwise and verify that the No.1 cylinder is at TDC of the compression stroke. (The position crank weight contacts the **SST**.)



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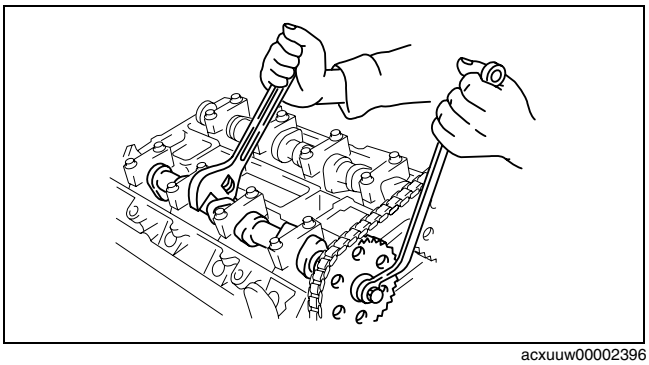
31. Fix the exhaust camshaft using a wrench on the cast hexagon, and tighten the sprocket installation bolt.

    **Tightening torque**
    **69— 75 N·m {7.1— 7.6 kgf·m, 51— 55 ft·lbf}**

32. Remove the **SST** from the camshaft.
33. Remove the **SST** installed in the cylinder block lower blind plug hole.
34. Rotate the crankshaft clockwise two turns and inspect the valve timing.
    - If it is not aligned, repeat the procedure.
35. Apply the silicone sealant and install the engine front cover upper blind plug.

    **Tightening torque**
    **8.0— 11.5 N·m {82— 117 kgf·cm, 71— 101 in·lbf}**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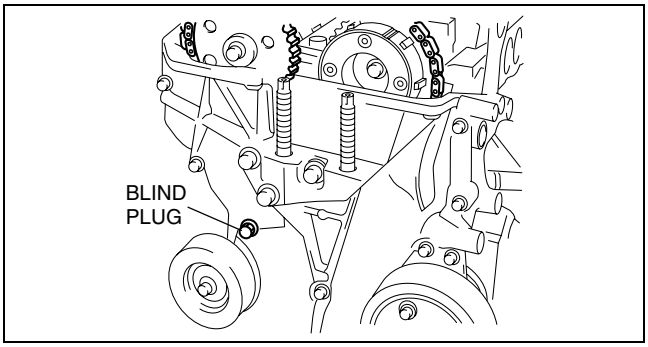

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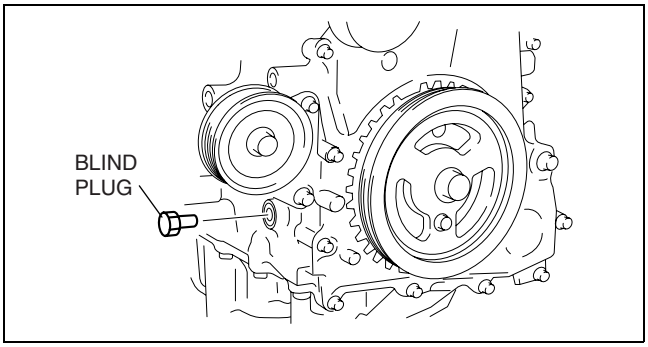
36. Install the cylinder block lower blind plug.

    **Tightening torque**
    **18— 22 N·m {1.9— 2.2 kgf·m, 14— 16 ft·lbf}**



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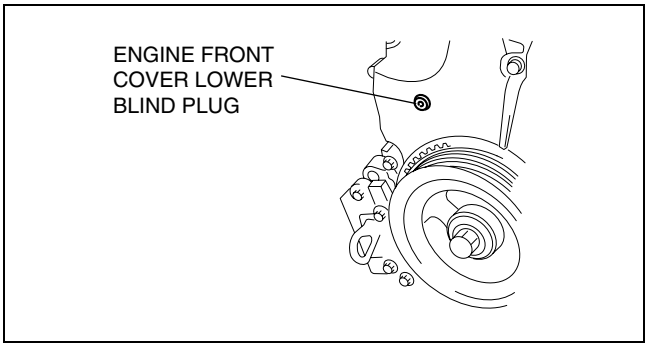
37. Install a new engine front cover lower blind plug.

    **Tightening torque**
    **10.0— 14.0 N·m {102— 142 kgf·cm, 89— 123 in·lbf}**

38. Install the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
39. Install the cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)



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40. Install the ventilation hose.
41. Connect the wiring harness.
42. Install the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
43. Install the high pressure fuel pump. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)
44. Install the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
45. Install the splash shield (RH).
46. Connect the negative battery cable.



**COMPRESSION INSPECTION[L3 WITH TC]**

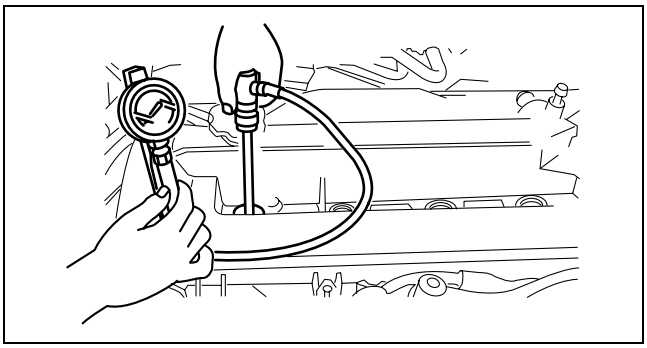
id011039800300

**Warning**
- **Hot engines can cause severe burns. Be careful not to burn yourself during removal/installation of each component.**
- **Fuel vapor is hazardous. It can very easily ignite, causing death, serious injury, or damage. Always keep sparks and flames away from fuel.**

1. Verify that the battery is completely charged. (See01-17-2 BATTERY INSPECTION[L3 WITH TC].)
2. Warm up the engine.

**Warning**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can easily ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always perform the Fuel Line Safety Procedure. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**

3. Remove the charge air cooler.
4. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove all the spark plugs. (See01-18-3 SPARK PLUG REMOVAL/INSTALLATION[L3 WITH TC])
6. Remove the fuel pump relay. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
7. Remove the fuel injector relay.
8. Measure the compression pressure using the following procedure.
   (1) Press the compression gauge into the spark plug hole.
   (2) Fully open the throttle valve.
   (3) Crank the engine and measure the compression pressure.



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**Compression**

**Standard: 1,280 kPa {13.1 kgf/cm$^2$, 185.65 psi} [250rpm]**

**Minimum: 896 kPa {9.14 kgf/cm$^2$, 129.96 psi} [250rpm]**

**Maximum difference between cylinders: 196.1 kPa {2.0 kgf/cm$^2$, 28.5 psi}**

   (4) Perform Steps (1) to (3) for all cylinders.
   (5) If it is less than the minimum specification, or there is a cylinder with a compression value that differs from that of other cylinders by **196.1 kPa or more {2.0 kgf/cm$^2$, 28.5 psi}**, add a small quantity of engine oil through the spark plug hole and perform Steps (1) to (3).
      - If the pressure increases by adding the engine oil, the piston ring or the cylinder surface is worn, or they are damaged. Perform overhaul servicing.
      - If the pressure does not increase, valve seizure, valve attachment failure, or pressure leakage from the cylinder head gasket might be occurring. Perform overhaul servicing.
9. Install the fuel injector relay.
10. Install the fuel pump relay. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
11. Install the spark plugs. (See01-18-3 SPARK PLUG REMOVAL/INSTALLATION[L3 WITH TC])
12. Install the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
13. Install the charge air cooler.

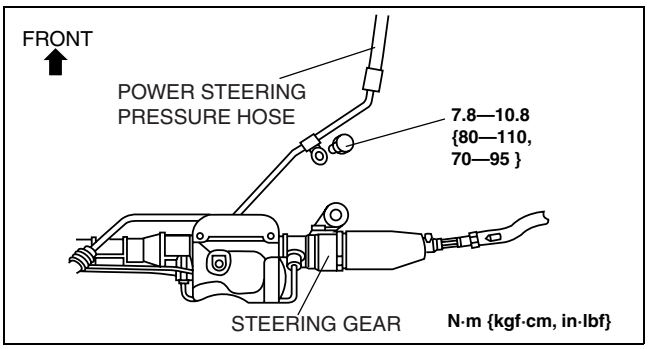
## TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC]

id011039801000

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove the splash shield.
4. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the high pressure fuel pump. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/ INSTALLATION[L3 WITH TC].)
6. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
7. Disconnect the wiring harness.
8. Remove the ventilation hose.
9. Remove the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
10. Remove the crankshaft position (CKP) sensor. (See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
11. Remove the P/S oil pump with the hoses and pipes still connected. (See06-14-21 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)

**Note**
- Position and secure the P/S oil pump out of the way with a rope or wire.

12. Remove the bracket shown in the figure, and place the power steering pressure hose outside of the vehicle.
13. Remove in the order indicated in the figure.
14. Install in the reverse order of removal.
15. Start the engine and inspect and adjust the following:
    (1) Engine oil amount (See01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
    (2) Runout and contact of pulley and belt.
    (3) Ignition timing, idle speed, and idle mixture (CO and HC) verification (See01-10-35 ENGINE TUNE-UP[L3 WITH TC].)

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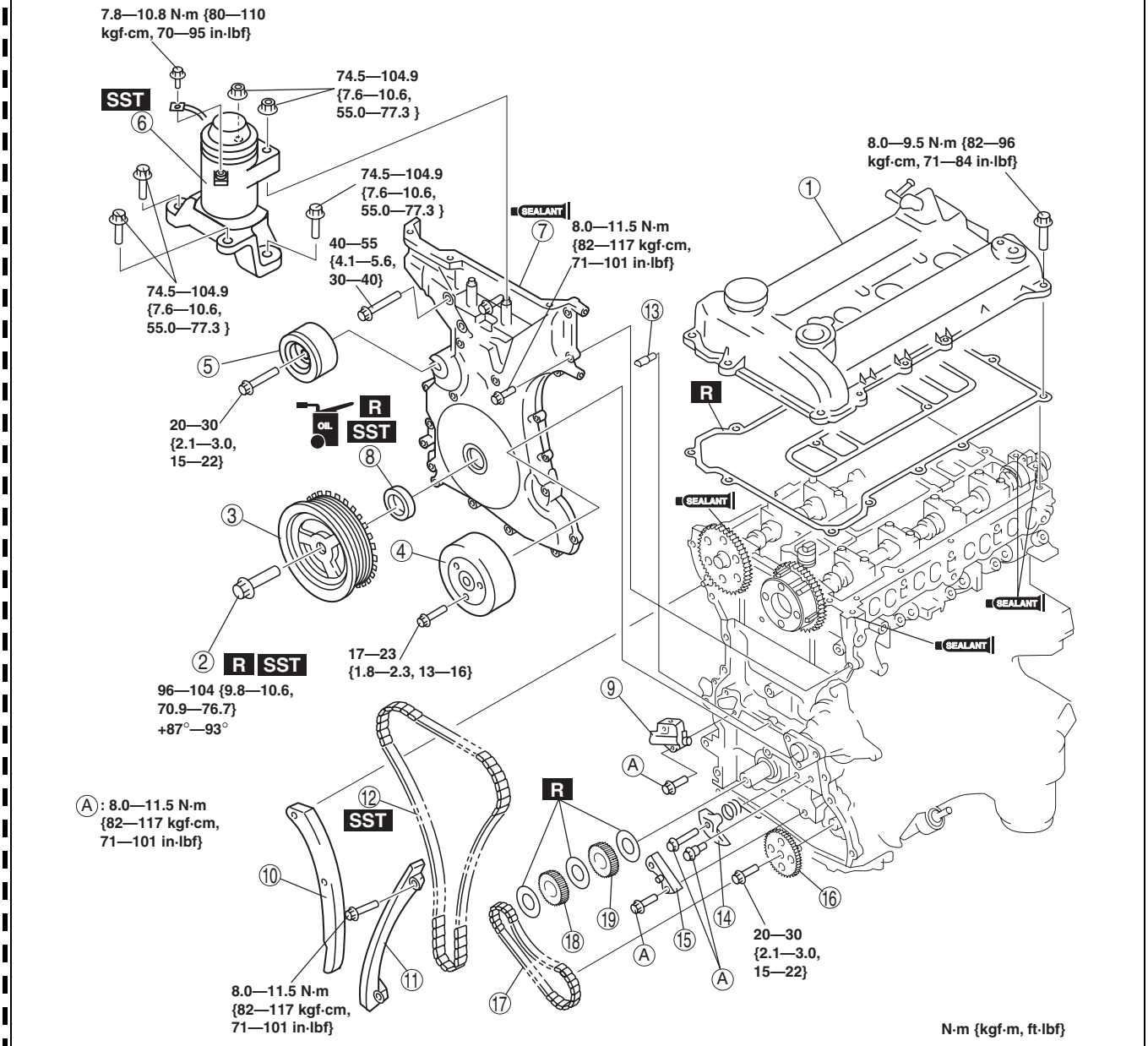


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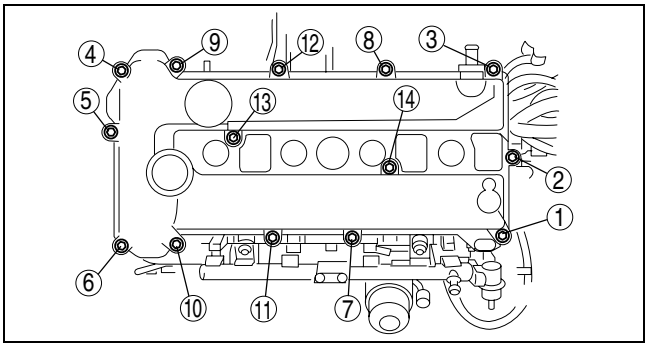
| | |
|---|---|
| 1 | Cylinder head cover<br>(See01-10-12 Cylinder Head Cover Removal Note.)<br>(See01-10-19 Cylinder Head Cover Installation Note.) |
| 2 | Crankshaft pulley lock bolt<br>(See01-10-12 Crankshaft Pulley Lock Bolt Removal Note.)<br>(See01-10-18 Crankshaft Pulley Lock Bolt Installation Note.) |
| 3 | Crankshaft pulley |
| 4 | Water pump pulley |
| 5 | Front drive belt idler pulley |
| 6 | No. 3 engine mount<br>(See01-10-12 No.3 Engine Mount Removal Note.)<br>(See01-10-17 No.3 Engine Mount Installation Note) |
| 7 | Engine front cover<br>(See01-10-17 Engine Front Cover Installation Note.) |
| 8 | Front oil seal<br>(See01-10-14 Front Oil Seal Removal Note.)<br>(See01-10-16 Front Oil Seal Installation Note.) |

| | |
|---|---|
| 9 | Chain tensioner<br>(See01-10-14 Chain Tensioner Removal Note.) |
| 10 | Tensioner arm |
| 11 | Chain guide |
| 12 | Timing chain<br>(See01-10-16 Timing Chain Installation Note.) |
| 13 | Oil jet |
| 14 | Oil pump chain tensioner |
| 15 | Oil pump chain guide |
| 16 | Oil pump driven sprocket<br>(See01-10-15 Oil Pump Driven Sprocket Removal Note.)<br>(See01-10-16 Oil Pump Driven Sprocket Installation Note.) |
| 17 | Oil pump chain |
| 18 | Crankshaft sprocket |
| 19 | Oil pump drive sprocket<br>(See01-10-16 Oil Pump Driven Sprocket Installation Note.) |

**Cylinder Head Cover Removal Note**

1. Loosen the cylinder head cover bolts in the order shown in the figure.

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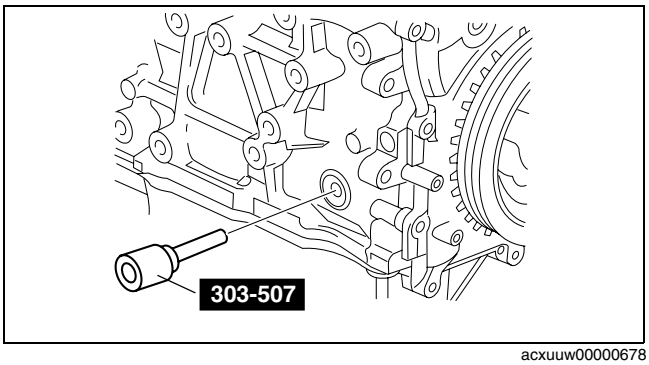
**Crankshaft Pulley Lock Bolt Removal Note**

1. Rotate the crankshaft in the direction of the engine rotation and remove the cylinder block lower blind plug when the No. 1 cylinder is at the point prior to top dead center (TDC) of compression, then install the **SST**.
2. Rotate the crankshaft in the direction of the engine rotation so that the No.1 piston is at TDC of the compression stroke. (Until the crank weight contacts **SST** and stops.)

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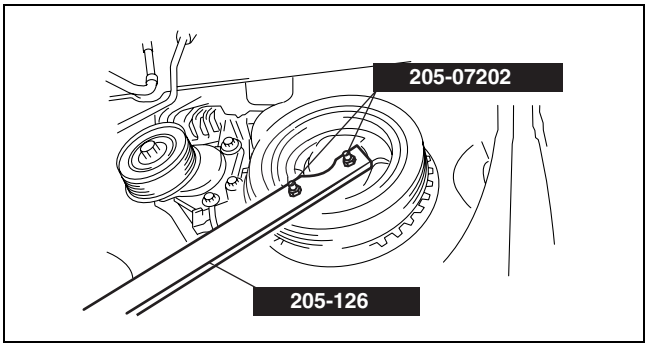
3. Install the **SST** to the crankshaft pulley and lock the crankshaft against rotation.

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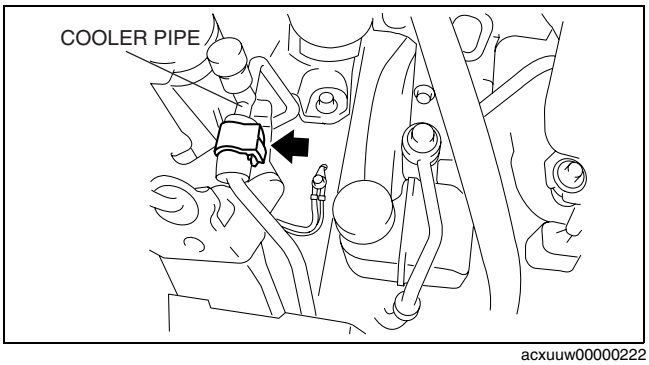
**No.3 Engine Mount Removal Note**

1. Remove the windshield wiper arm and blade. (See09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
3. Remove the air cleaner and air cleaner bracket. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
4. To install the front shaft (RH) of the **SST**, remove the clip shown the figure.

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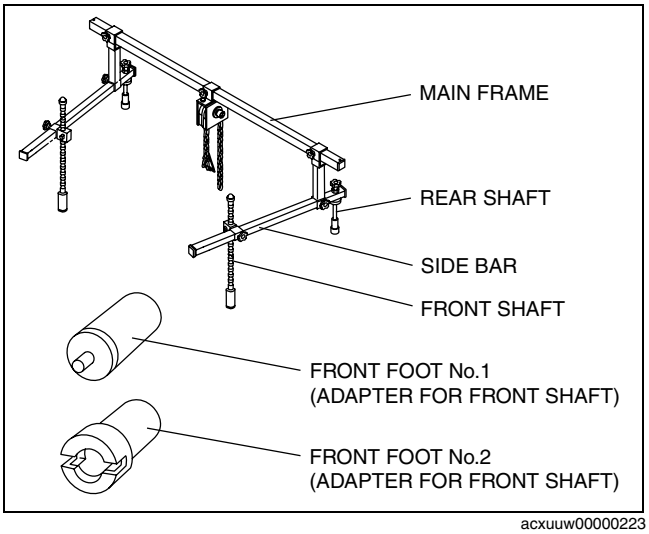
5. Install the SST using the following procedure.

**Caution**
- **Refer to the SST instruction manual for the basic handing procedure.**

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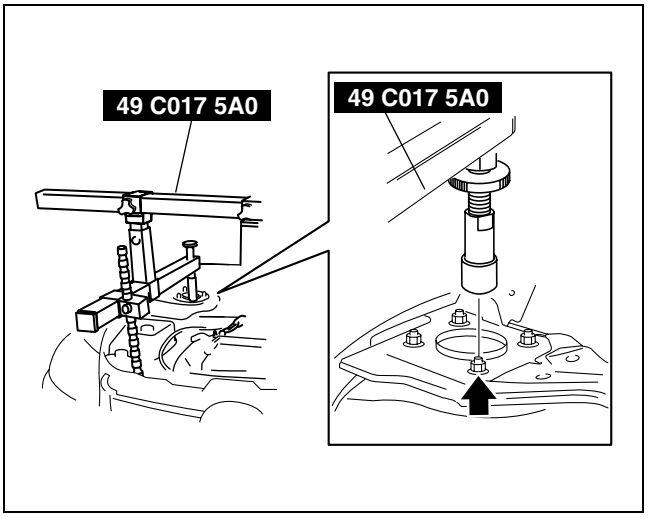
(1) Install the right rear shaft of the **SST** to the bolt of the right shock absorber as shown in the figure.
(2) Install the left rear shaft of the **SST** to the bolt of the left shock absorber. (Identical position to the right side)

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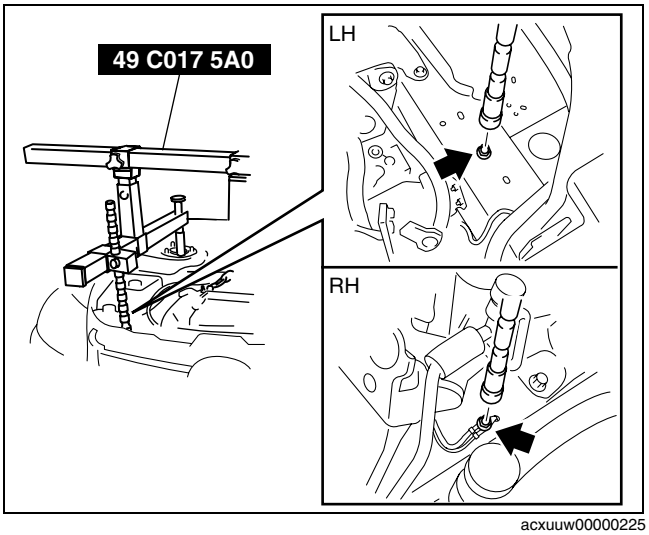
(3) Temporarily tighten the bolt (M6 x 1.0) to the air cleaner bracket installation position and install front foot No. 2 to the left/right front shaft of the **SST**, and align the front shaft hole of the **SST** with the bolt as shown in the figure.
(4) Adjust the positions of the **SST** side bars so that they are the same height (left and right) and horizontal.
(5) Make sure each joint is securely tightened.

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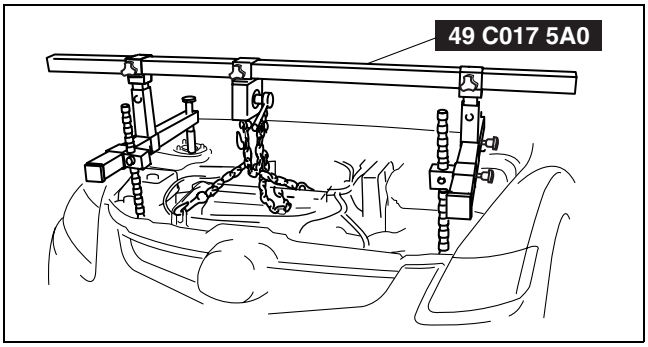
6. Support the engine using the **SST.**

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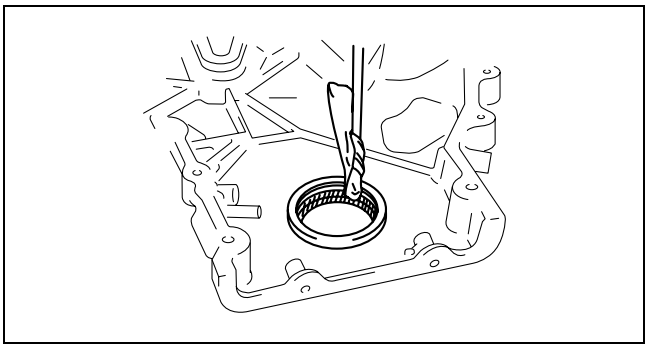
**Front Oil Seal Removal Note**

1. Remove the front oil seal using a flathead screwdriver or similar tool.



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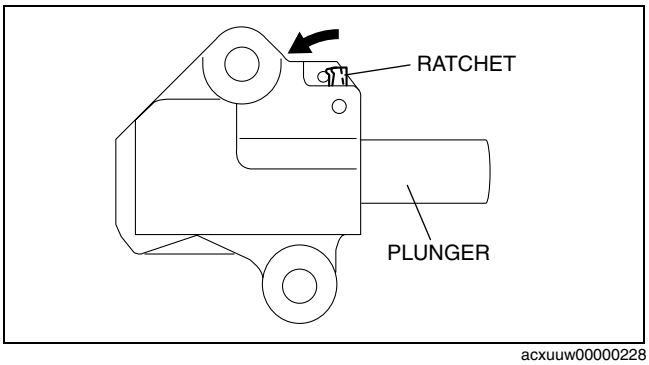
**Chain Tensioner Removal Note**

1. Press the timing chain tensioner ratchet to the left using a thin flathead screwdriver (precision screwdriver) to unlock the plunger.

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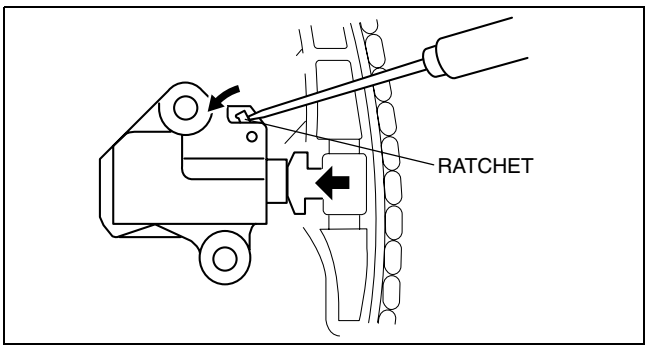
2. Slowly press the plunger back in the direction shown in the figure while pressing the ratchet.

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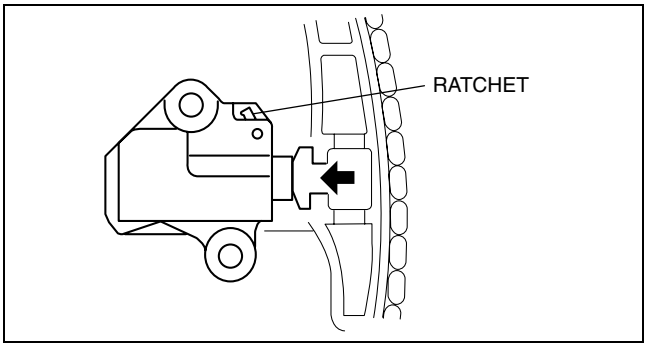
3. Release the ratchet with the plunger still pressed down.

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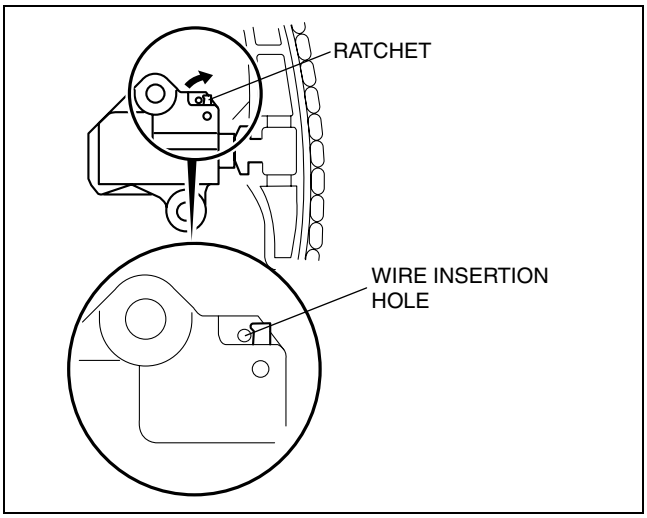
4. Press-in the plunger until the ratchet position is as indicated in the figure, and then insert the wire to lock the plunger.

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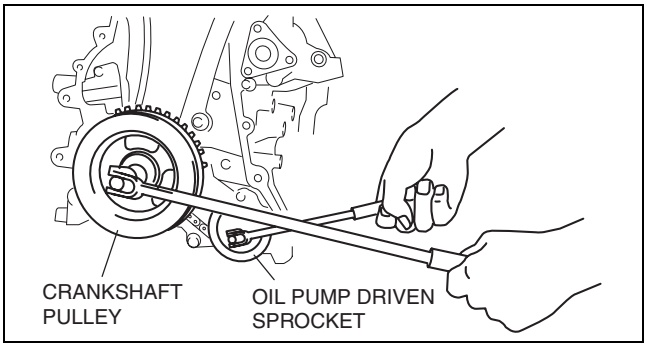
**Oil Pump Driven Sprocket Removal Note**

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.
2. Remove the oil pump driven sprocket, and then remove the crankshaft pulley and crankshaft pulley lock bolt.

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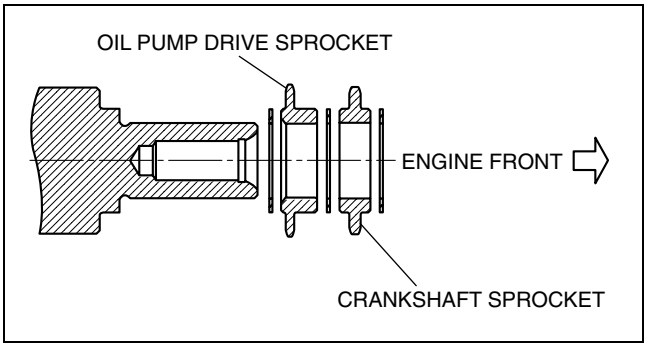
**Oil Pump Drive Sprocket Installation Note**

1. The oil pump drive sprocket has the assembly direction as shown in the figure.

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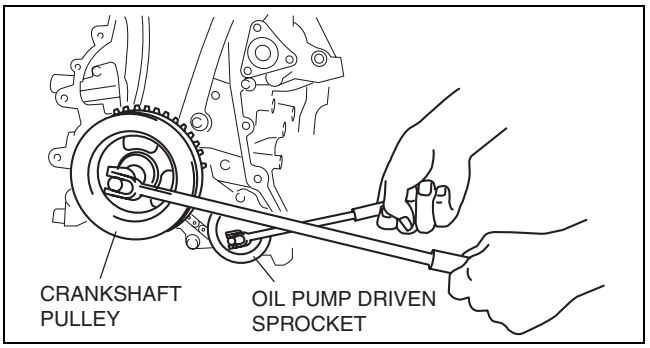
**Oil Pump Driven Sprocket Installation Note**

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.
2. Install the oil pump driven sprocket, and then remove the crankshaft pulley and crankshaft pulley lock bolt.

**Tightening torque**
**20—30 N·m {2.1—3.0 kgf·m, 15—22 ft·lbf}**



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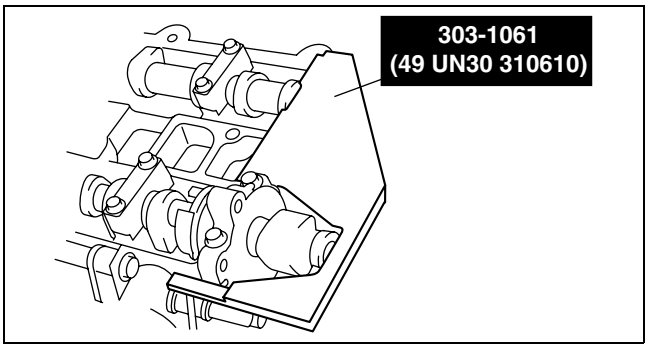
**Timing Chain Installation Note**

1. Install the **SST** to the camshaft as shown in the figure.
2. Install the timing chain.
3. Remove the wire or paper clip from the chain tensioner piston and apply tension to the timing chain.



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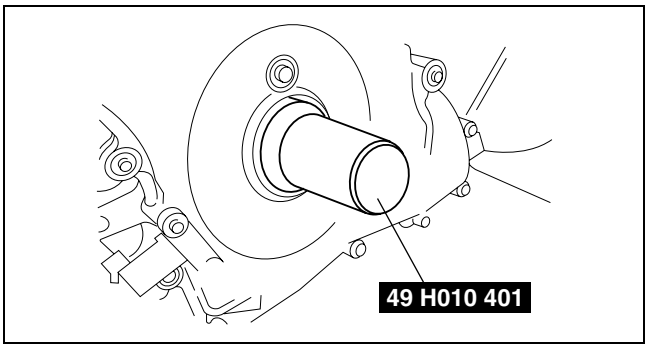
**Front Oil Seal Installation Note**

1. Apply clean engine oil to a new front oil seal.
2. Push the front oil seal in the engine front cover by hand.
3. Use the **SST** to tap in the front oil seal.



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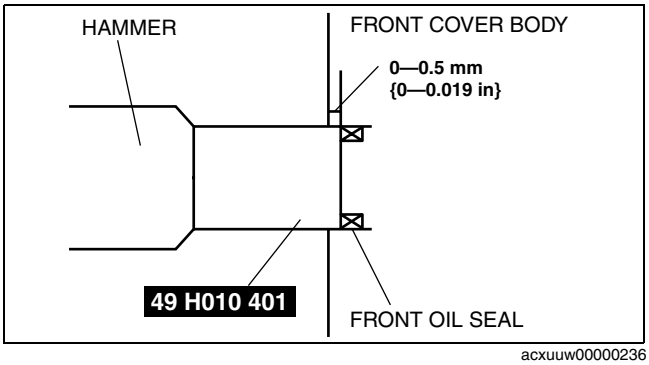
**Front oil seal press-in amount**
**0— 0.5 mm {0— 0.019 in}**



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**Engine Front Cover Installation Note**

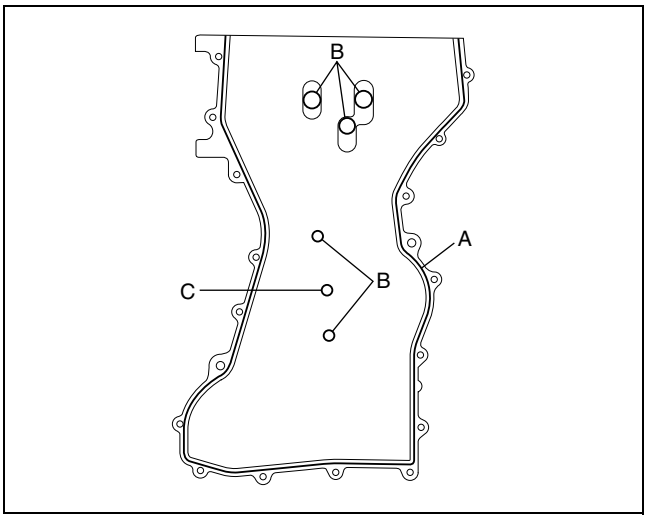
1. Apply silicone sealant to the engine front cover.

**Caution**

- **Install the engine front cover within 10 min of applying the silicone sealant.**
- **Silicone sealant is not needed in area C shown in the figure.**

**Thickness**

**A: 2.2— 3.2 mm {0.087— 0.12 in}**
**B: 1.5— 2.5 mm {0.06— 0.098 in}**

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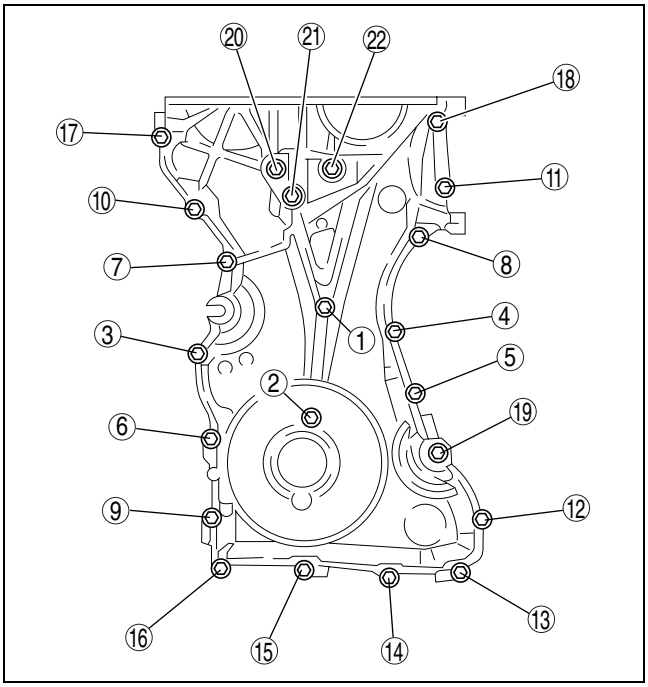
2. Tighten the engine front cover installation bolts in the order shown in the figure.

| Installation Position | Tightening Torque |
|---|---|
| 1—18 | 8.0— 11.5 N·m {82— 117 kgf·cm, 71— 101 in·lbf} |
| 19—22 | 40— 55 N·m {4.1— 5.6 kgf·m, 30— 40 ft·lbf} |

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**No.3 Engine Mount Installation Note**

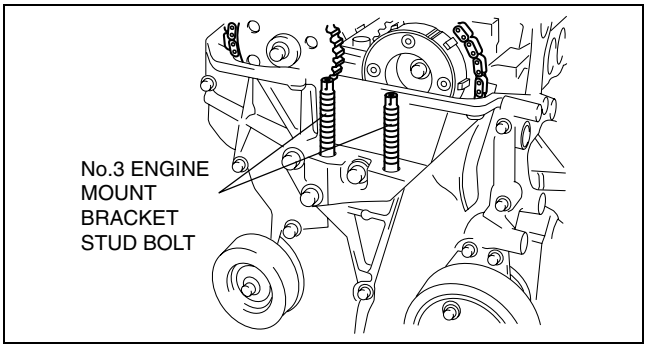
1. Tighten the No.3 engine mount stud bolts.

**Tightening torque**

**7.0— 13 N·m {72— 132 kgf·cm, 62— 115 in·lbf}**

**Note**

- If the No.3 engine joint bracket and the engine are removed, retighten the No.3 engine mount stud bolt

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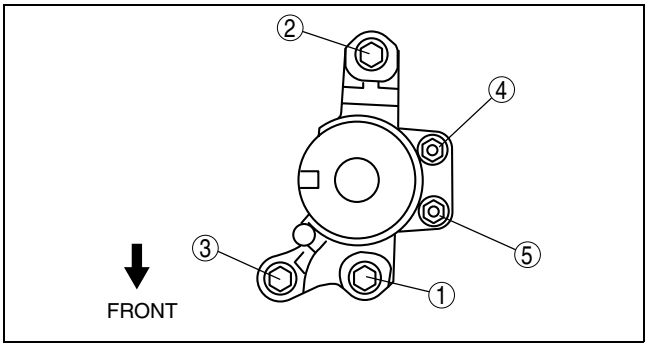
2. Temporarily tighten the bolts and nuts in the order shown in the figure.

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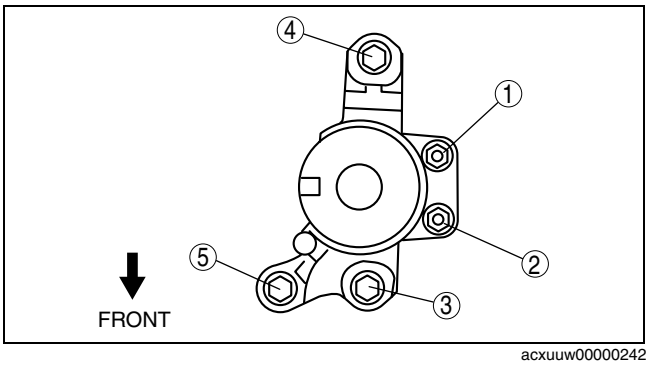
3. Tighten the bolts and nuts in the order shown in the figure.

**Tightening torque**
**74.5— 104.9 N·m {7.6— 10.6 kgf·m, 55.0— 77.3 ft·lbf}**

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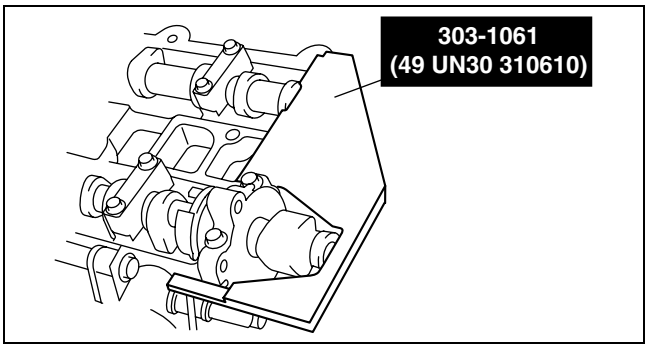
**Crankshaft Pulley Lock Bolt Installation Note**

1. Install the **SST** to the camshaft as shown in the figure.
2. Verify that cylinder No.1 is at TDC of the compression stroke. (Position crank weight contacts **SST**.)

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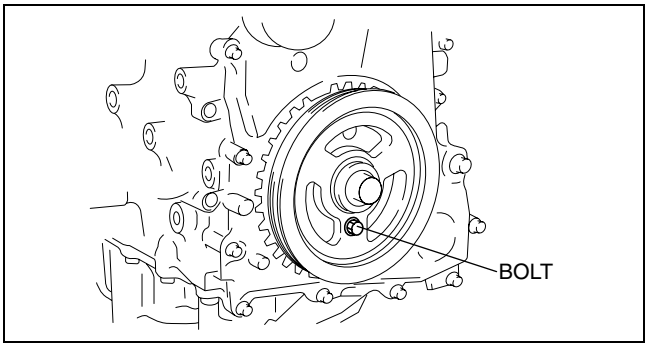
3. To position the crankshaft pulley, temporarily tighten it and, using a suitable bolt (**M6 X 1.0 length 25— 35 mm {0.99— 1.3 in}**), fix the crankshaft pulley to the engine front cover.

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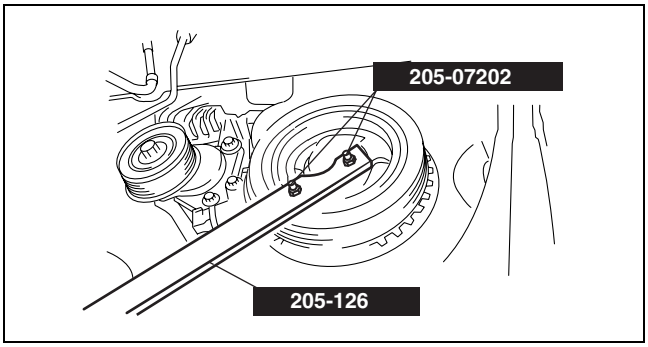
4. Install the**SSTs** to the crankshaft pulley, lock the crankshaft against rotation, and tighten the crankshaft pulley lock bolt using the following two steps.

**Tightening procedure**
**(1) 96— 104 N·m {9.8— 10.6 kgf·m, 70.9— 76.7 ft·lbf}**
**(2) 87°— 93°**

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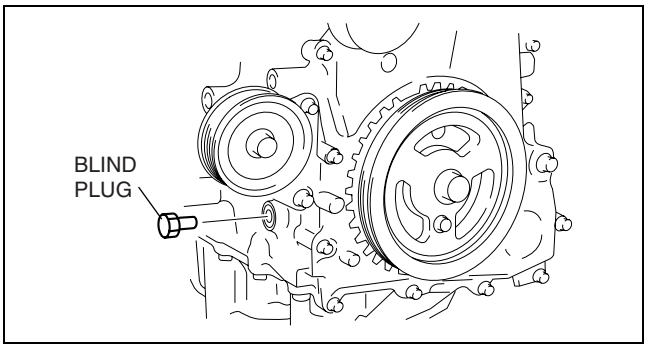
5. Remove the bolt (**M6 X 1.0 length 25— 35 mm {0.99— 1.3 in}**) installed to the crankshaft pulley.
6. Remove the **SST** from the camshaft.
7. Remove the **SST** installed in the cylinder block lower blind plug hole.
8. Rotate the crankshaft clockwise two turns and inspect the valve timing.
   - If not aligned, repeat from Step 1.
9. Install the cylinder block lower blind plug.

**Tightening torque**
**18— 22 N·m {1.9— 2.2 kgf·m, 14— 16 ft·lbf}**



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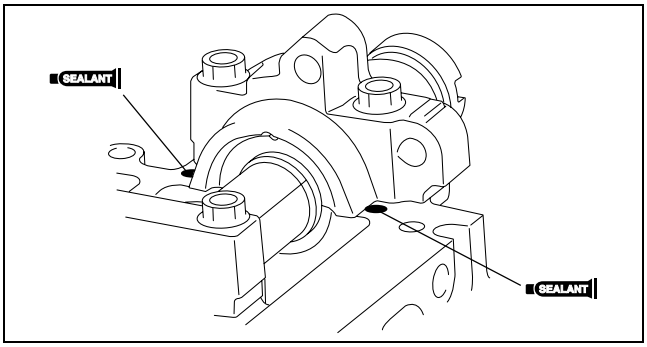
**Cylinder Head Cover Installation Note**

1. Apply silicone sealant to the areas shown in the figure.



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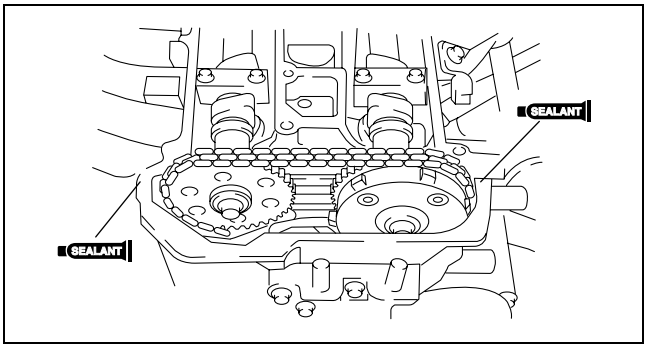
**Thickness**
**5.0 mm {0.20 in}**



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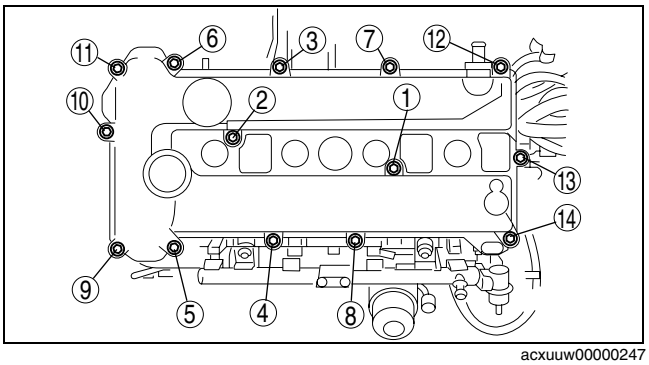
2. Tighten the cylinder head cover bolts in the order shown in the figure.

**Tightening torque**
**8.0—9.5 N·m {82—96 kgf·cm, 71—84 in·lbf}**



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## CYLINDER HEAD GASKET REPLACEMENT[L3 WITH TC]

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**Warning**

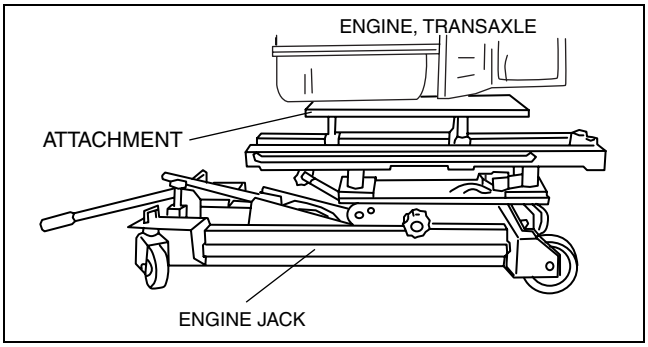
- **Fuel vapor is hazardous. It can very easily ignite, causing death, serious injury, or damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can easily ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always perform the Fuel Line Safety Procedure. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**

1. Remove the timing chain. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the generator. (See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC].)

**Note**

- Place the generator out of the way with the wiring harnesses connected.

3. Remove the exhaust manifold. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the intake manifold. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Disconnect the heater hose and radiator hose.
6. Disconnect the wiring harness.
7. To firmly support the engine, first set the engine jack and attachment to the oil pan.
8. Remove in the order indicated in the figure.
9. Install in the reverse order of removal.
10. Bleed the air from the cooling system. (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
11. Inspect the compression pressure. (See01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)

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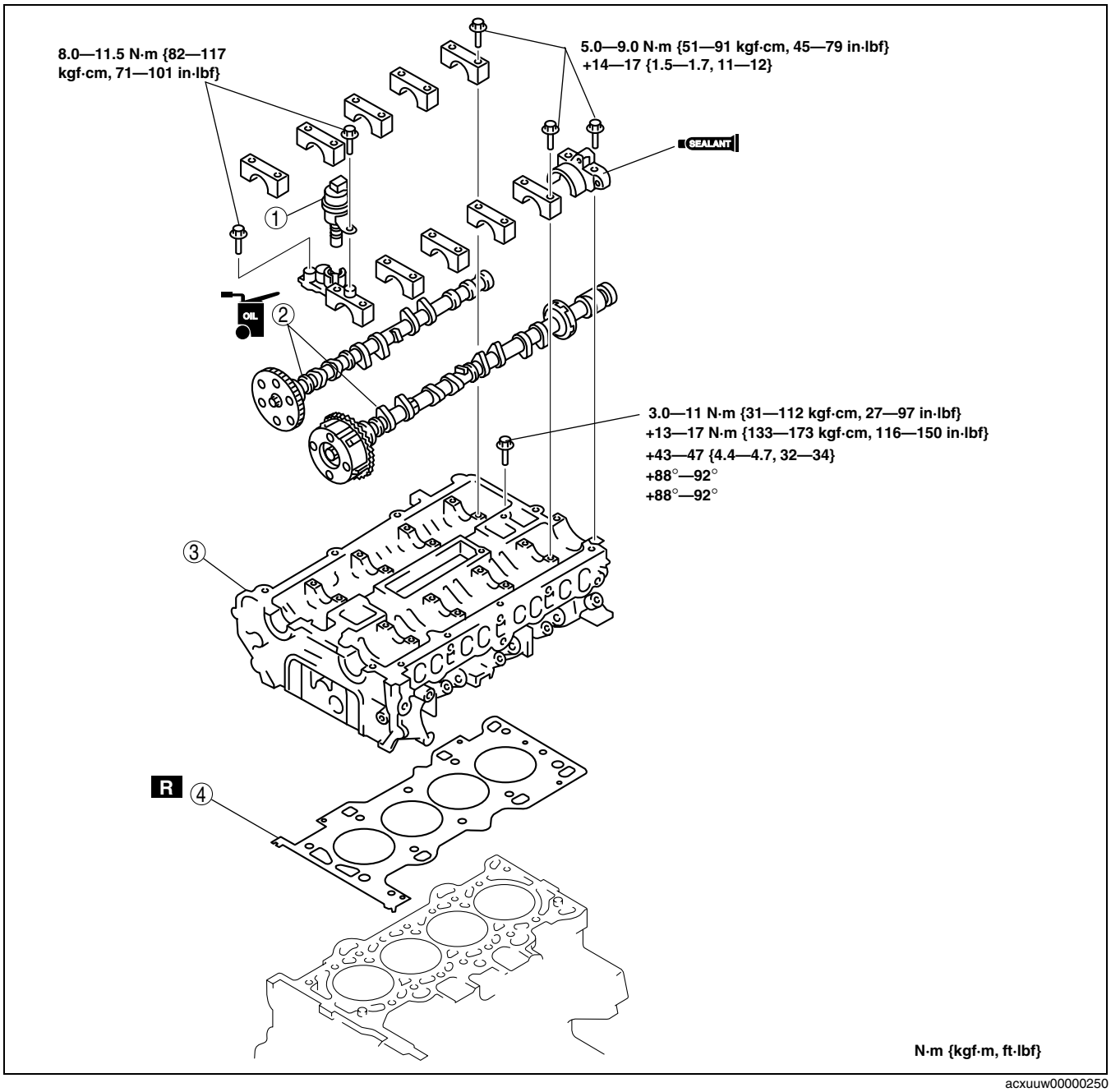


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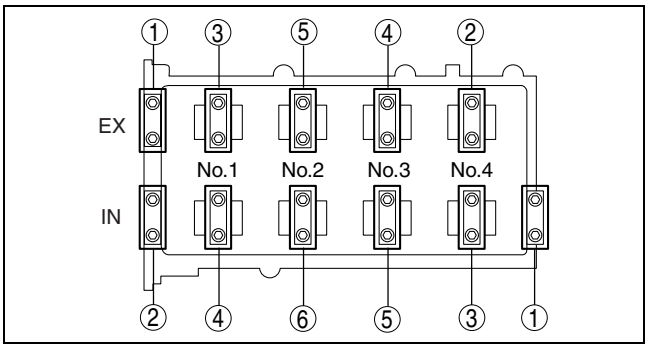
| | |
|---|---|
| 1 | OCV |
| 2 | Camshaft<br>(See01-10-22 Camshaft Removal Note.)<br>(See01-10-23 Camshaft Installation Note.) |

| | |
|---|---|
| 3 | Cylinder head<br>(See01-10-22 Cylinder Head Removal Note.)<br>(See01-10-22 Cylinder Head Installation Note.) |
| 4 | Cylinder head gasket |

**Camshaft Removal Note**

**Note**
- The camshaft caps are to be kept ordered for correct reassembly in their original positions.

1. Loosen the camshaft cap bolts in two or three passes in the order shown, and remove them.



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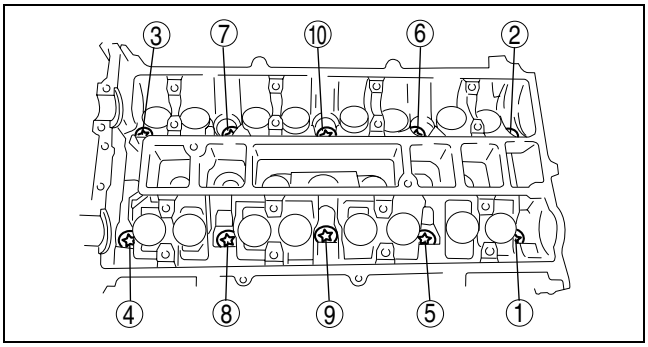
**Cylinder Head Removal Note**

1. Loosen the cylinder head installation bolts in two to three passes in the order shown in the figure and remove them.



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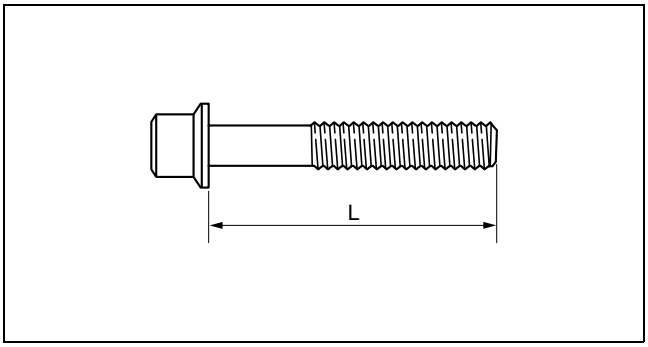
**Cylinder Head Installation Note**

1. Measure the length of each cylinder head bolt.
   - Replace any cylinder head bolts that exceed the maximum length.

**Cylinder head bolt length**
**Standard: 144.7— 145.3 mm {5.697— 5.720 in}**
**Maximum: 146 mm {5.74 in}**



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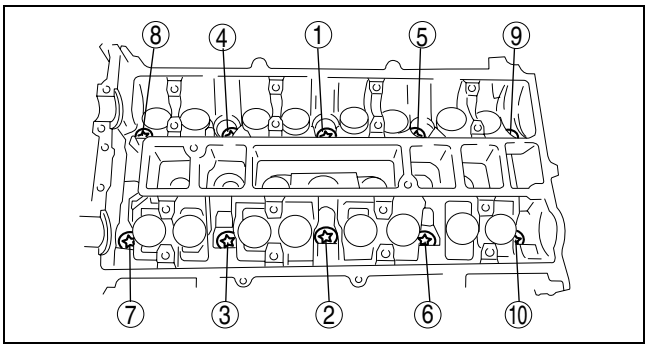
**Tightening procedure**
1. **3.0— 11 N·m {31— 112 kgf·cm, 27— 97 in·lbf}**
2. **13— 17 N·m {133— 173 kgf·cm, 116— 150 in·lbf}**
3. **43— 47 N·m {4.4— 4.7 kgf·m, 32— 34 ft·lbf}**
4. **88°— 92°**
5. **88°— 92°**



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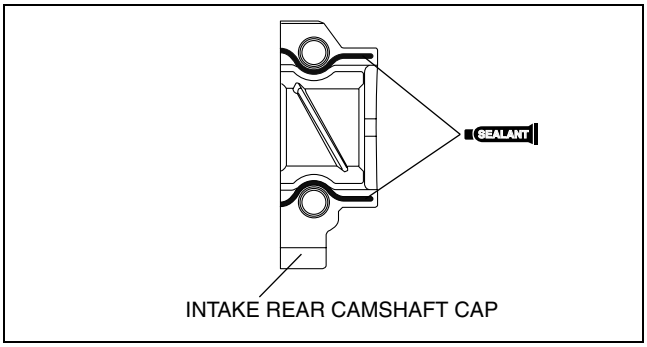
**Camshaft Installation Note**

1. Install the camshaft with No.3 cylinder cam aligned at TDC of compression stroke.
2. Carefully apply adhesive agent (Loctite 518 or 962) to the area indicated in the figure so that it does not leak into the sliding part.

   **Thickness**
   **1.0 mm {0.039 in}**

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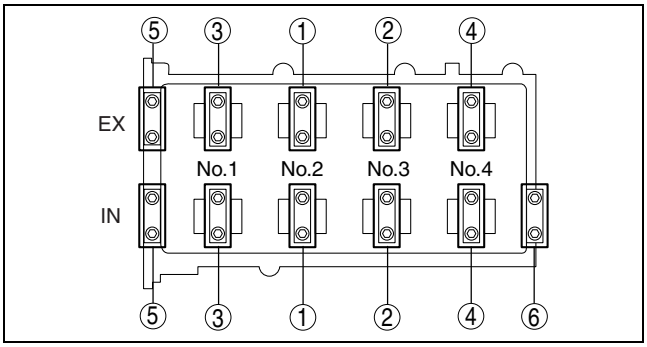
3. Install the camshaft caps and temporarily tighten the camshaft cap bolts evenly in two or three passes, and then tighten the camshaft cap bolts using the following two steps, in the order shown in the figure.

   **Tightening procedure**
   **1. 5.0— 9.0 N·m {51— 91 kgf·cm, 45— 79 in·lbf}**
   **2. 14— 17 N·m {1.5— 1.7 kgf·m, 11— 12 ft·lbf}**

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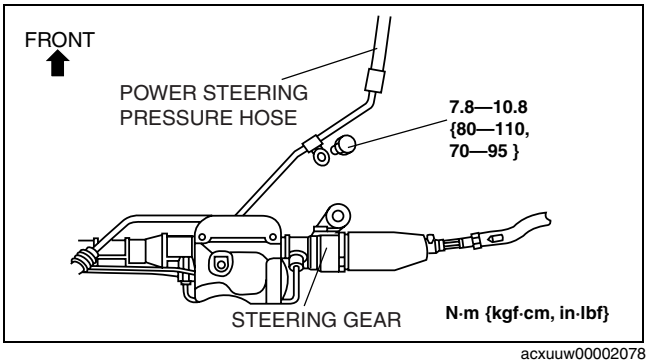
**FRONT OIL SEAL REPLACEMENT[L3 WITH TC]**

id011039800800

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove the splash shield (RH).
4. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the high pressure fuel pump. (See 01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
8. Disconnect the wiring harness.
9. Remove the ventilation hose.
10. Remove cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
11. Remove the crankshaft position (CKP) sensor. (See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
12. Remove the bracket shown in the figure, and place the power steering pressure hose outside of the vehicle.
13. Remove in the order indicated in the figure.
14. Install in the reverse order of removal.

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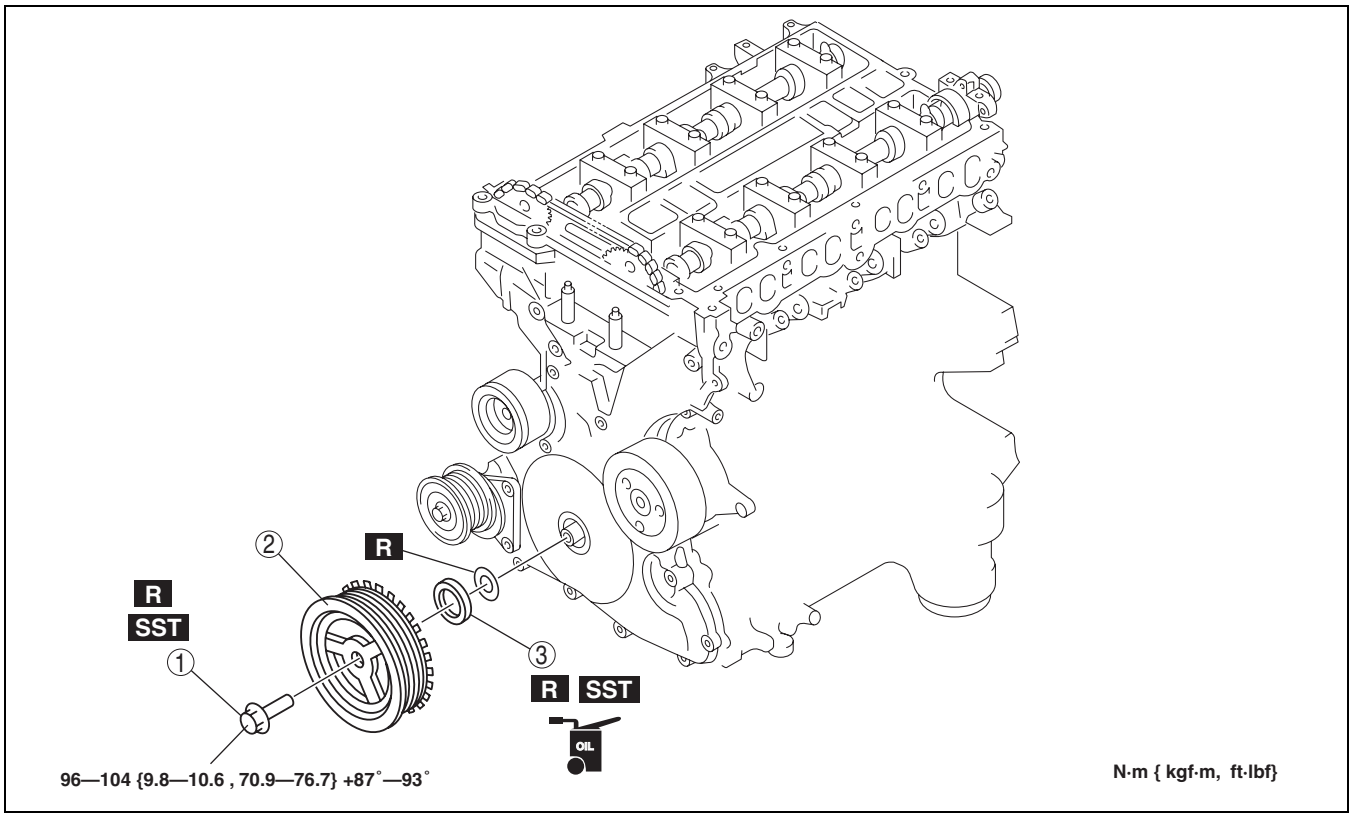


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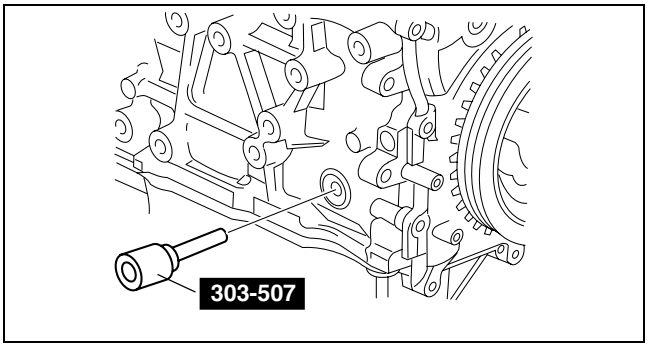
| | |
|---|---|
| 1 | Crankshaft pulley lock bolt<br>(See01-10-24 Crankshaft Pulley Lock Bolt Removal Note.)<br>(See01-10-25 Crankshaft Pulley Lock Bolt Installation Note.) |

| | |
|---|---|
| 2 | Crankshaft pulley |
| 3 | Front oil seal<br>(See01-10-25 Front Oil Seal Removal Note.)<br>(See01-10-25 Front Oil Seal Installation Note.) |

**Crankshaft Pulley Lock Bolt Removal Note**

1. Rotate the crankshaft in the direction of the engine rotation and remove the cylinder block lower blind plug when the No. 1 cylinder is at the point prior to top dead center (TDC) of compression, then install the **SST**.
2. Rotate the crankshaft in the direction of the engine rotation so that the No.1 piston is at TDC of the compression stroke. (Until the crank weight contacts **SST** and stops.)

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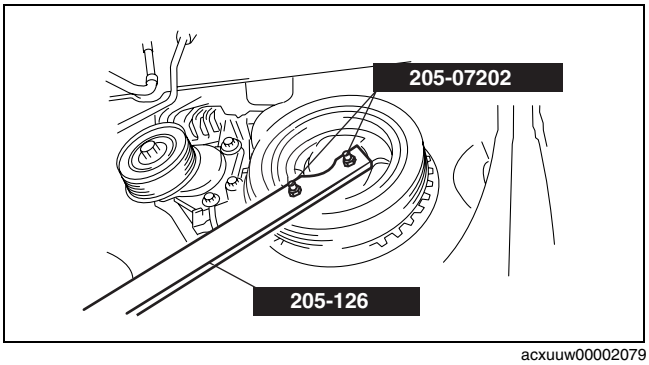
3. Install the **SSTs** to the crankshaft pulley and lock the crankshaft against rotation.

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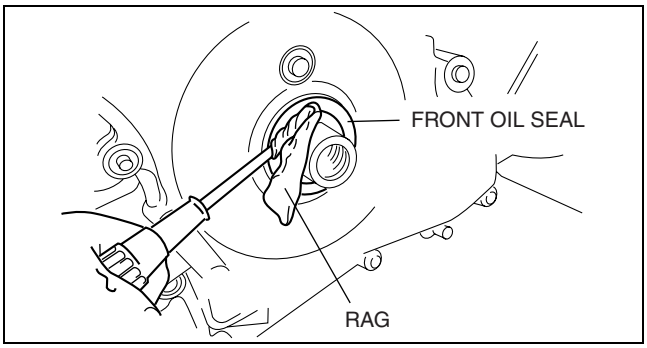
**Front Oil Seal Removal Note**

1. Remove the oil seal lip using a razor.
2. Remove the oil seal using a flathead screwdriver with the tip protected by a rag to prevent crankshaft oil seal damage.

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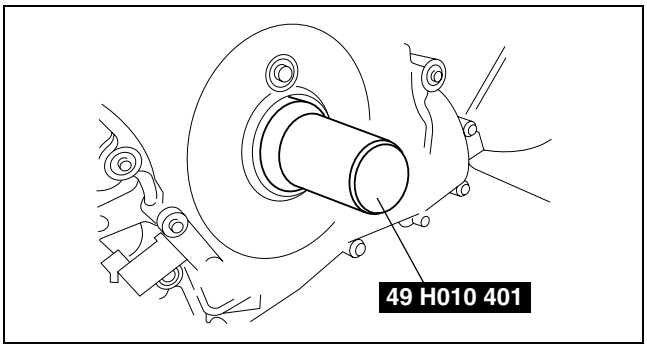
**Front Oil Seal Installation Note**

1. Apply clean engine oil to a new oil seal.
2. Insert the oil seal into the engine front cover.
3. Tap in the oil seal using the **SST.**

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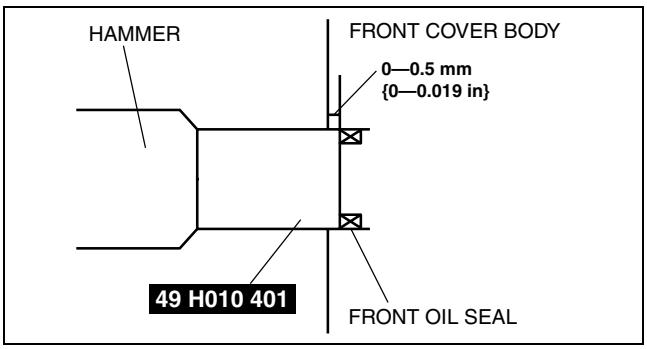
**Front oil seal press-in amount**
**0— 0.5 mm {0— 0.019 in}**

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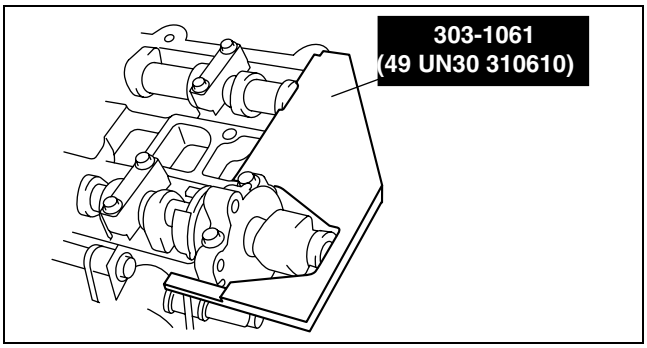
**Crankshaft Pulley Lock Bolt Installation Note**

1. Install the **SST** to the camshaft as shown in the figure.
2. Verify that cylinder No.1 is at TDC of the compression stroke. (Position crank weight contacts **SST**.)

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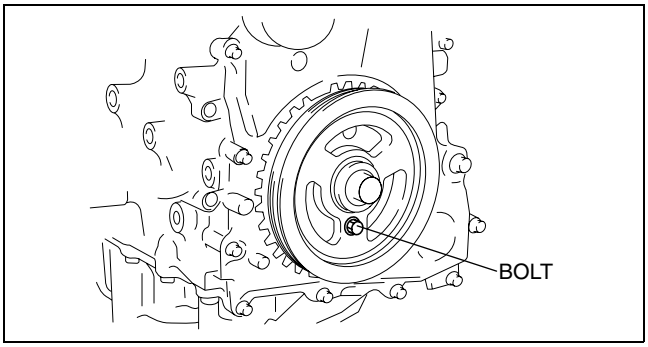
3. To position the crankshaft pulley, temporarily tighten it and, using a suitable bolt (**M6 x 1.0**), fix the crankshaft pulley to the engine front cover.

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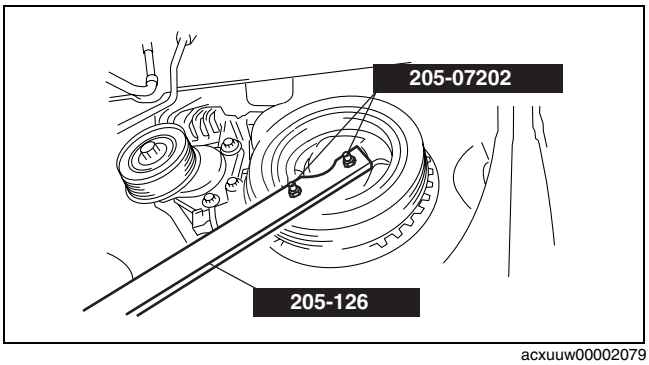
4. Install the **SSTs** to the crankshaft pulley and lock the crankshaft against rotation, and tighten the crankshaft pulley lock bolt using the following two steps.

   **Tightening procedure**
   **(1) 96— 104 N·m {9.8— 10.6 kgf·m, 70.9— 76.7 ft·lbf}**
   **(2) 87°— 93°**

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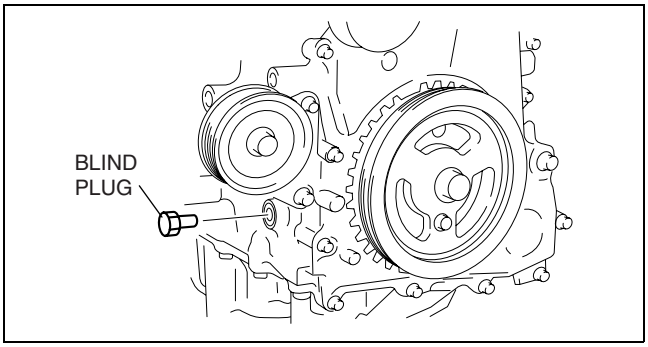
5. Remove the crankshaft pulley installation bolt **(M6 X 1.0).**
6. Remove the SST from the camshaft.
7. Remove the SST installed in the cylinder block lower blind plug hole.
8. Rotate the crankshaft clockwise two turns and inspect the valve timing.
   - If not aligned, repeat from Step 1.
9. Install the cylinder block lower blind plug.

   **Tightening torque**
   **18— 22 N·m {1.9— 2.2 kgf·m, 14— 16 ft·lbf}**

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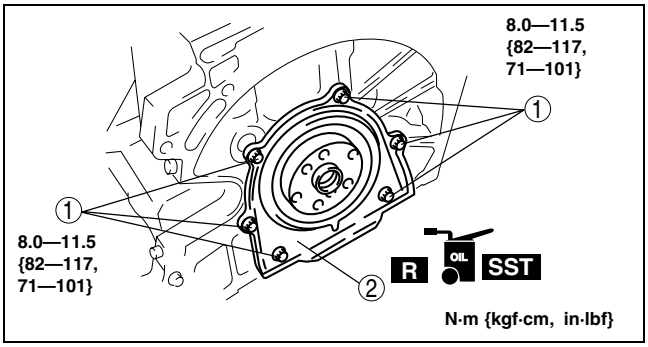
**REAR OIL SEAL REPLACEMENT[L3 WITH TC]**

id011039800900

1. Remove the drive plate. (See 05-17-52 DRIVE PLATE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
2. Remove in the order indicated in the figure.
3. Install in the reverse order of removal.

| | |
|---|---|
| 1 | Bolt |
| 2 | Rear oil seal<br>(See01-10-27 Rear Oil Seal Installation Note.) |

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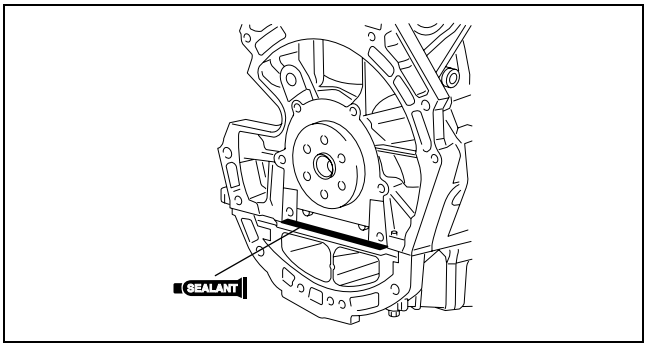
**Rear Oil Seal Installation Note**

1. Apply silicone sealant to the areas shown in the figure.

   **Caution**
   - **Install the rear oil seal within 10 min of applying the silicone sealant.**

   **Thickness**
   **4.0— 6.0 mm {0.16— 0.23 in}**

2. Apply clean engine oil to a new rear oil seal.

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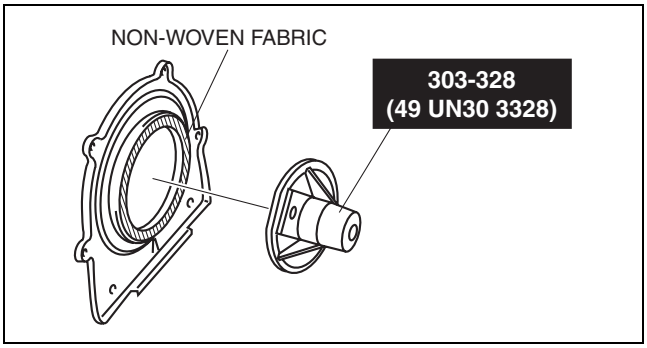
3. Install the **SST** to the non-woven fabric side of the rear oil seal.

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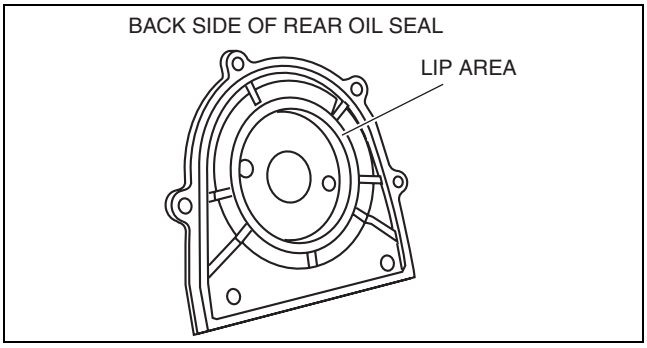
4. From the back side of the rear oil seal, verify that there is no damage or separation in the lip area of the rear oil seal.

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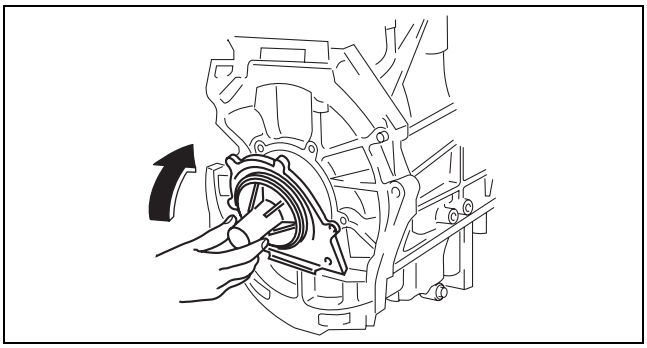
5. Install the rear oil seal to the engine as shown in the figure.



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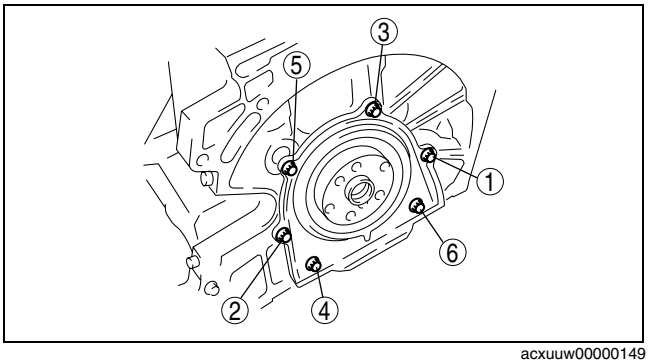
6. Tighten the rear oil seal installation bolts in the order shown in the figure.

   **Tightening torque**
   **8.0— 11.5 N·m {82— 117 kgf·cm, 71— 101 in·lbf}**

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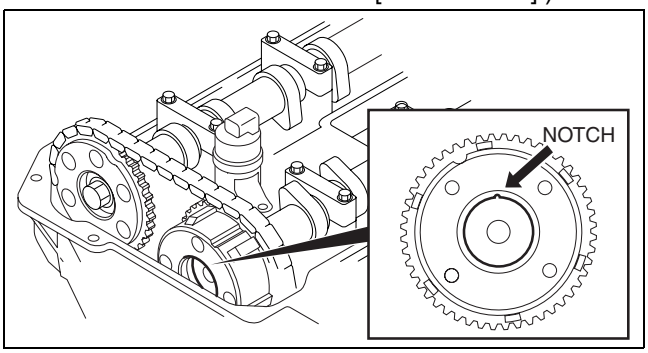
## VARIABLE VALVE TIMING ACTUATOR INSPECTION[L3 WITH TC]

id011039801200

**Caution**
- **Due to the precision interior construction of the variable valve timing actuator, it cannot be disassembled.**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the spark plugs. (See01-18-3 SPARK PLUG REMOVAL/INSTALLATION[L3 WITH TC].)
5. Disconnect the wiring harness.
6. Remove the ventilation hose.
7. Remove cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
8. Verify that the groove of the rotor and notch of the cover on the variable valve timing actuator are aligned and fitted.
   - If they are not aligned, rotate the crankshaft in the direction of engine rotation two times and verify that they are aligned.
     — If they will not align, replace the variable valve timing actuator.
   - If under any condition, the variable valve timing actuator always makes a hitting noise directly after the camshaft exceeds maximum lift while rotating the crankshaft two times in the direction of engine rotation, replace the variable valve timing actuator as it has not been fixed.



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9. Install the cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
10. Install the ventilation hose.
11. Connect the wiring harness.
12. Install the spark plugs. (See01-18-3 SPARK PLUG REMOVAL/INSTALLATION[L3 WITH TC].)
13. Install the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
14. Install the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
15. Connect the negative battery cable.

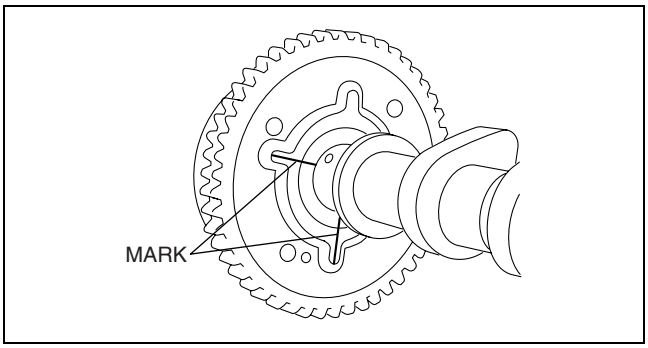
## VARIABLE VALVE TIMING ACTUATOR REMOVAL/INSTALLATION[L3 WITH TC]

id011039801100

**Caution**
- **Remove the variable valve timing actuator and camshaft sprocket as a single unit.**

**Note**
- The variable valve timing actuator and camshaft sprocket cannot be disassembled.

1. Referring to the valve clearance adjustment procedure, remove the variable valve timing actuator and the camshaft on the intake air side as a single unit. (See01-10-4 VALVE CLEARANCE INSPECTION/ ADJUSTMENT[L3 WITH TC].)
2. Remove the variable valve timing actuator.
   (1) Place alignment marks on the camshaft and variable valve timing actuator as shown in the figure so that the variable valve timing actuator is re-assembled in its original position.
   (2) Fix the camshaft in a vise.
   (3) Loosen the variable valve timing actuator installation bolt.



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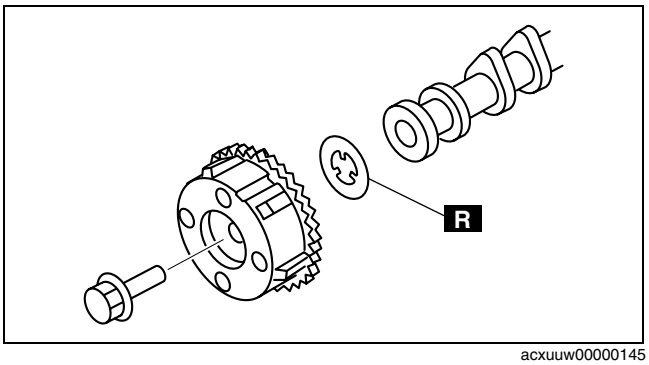
3. Install a new washer.
4. Install the variable valve timing actuator.
   (1) Fix the camshaft in a vise.
   (2) Align the marks on the camshaft and the variable valve timing actuator.



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**Caution**
- **If replacing with a new variable valve timing actuator, place alignment marks in the same positions as those prior to the replacement.**

   (3) Tighten the variable valve timing actuator installation bolt.

**Tightening torque**
**69— 75 N·m {7.1— 7.6 kgf·m, 51— 55 ft·lbf}**

5. Referring to the valve clearance adjustment procedure, install the variable valve timing actuator and camshaft on the intake air side as a single unit. (See01-10-4 VALVE CLEARANCE INSPECTION/ADJUSTMENT[L3 WITH TC].)

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## OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION[L3 WITH TC]

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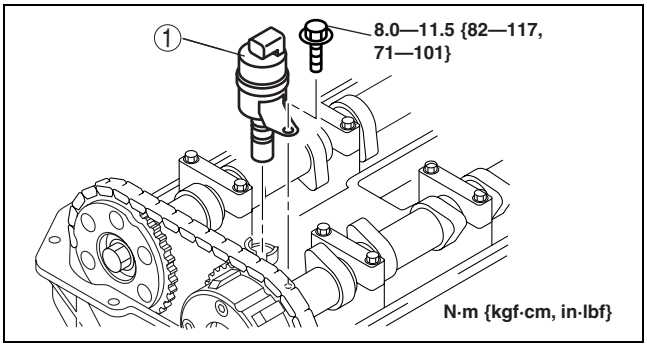
1. Disconnect the negative battery cable.
2. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the ignition coils. (See01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
4. Disconnect the wiring harness.
5. Remove the ventilation hose.
6. Remove the cylinder head cover. (See01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.

| | |
|---|---|
| 1 | OCV |

**Tightening torque**
**8.0— 11.5 N·m {82— 117 kgf·cm, 71— 101 in·lbf}**

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## OIL CONTROL VALVE (OCV) INSPECTION[L3 WITH TC]

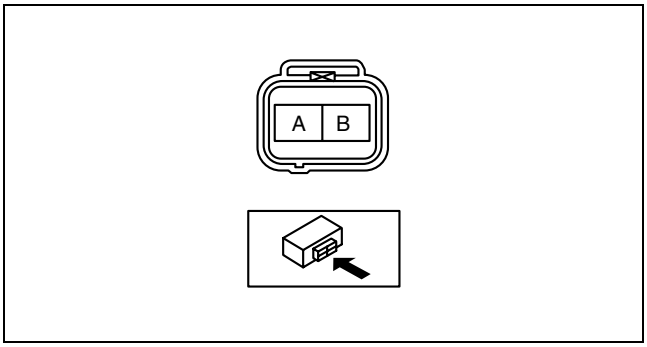
id011039801400

**Coil Resistance Inspection**

1. Disconnect the negative battery cable.
2. Disconnect the OCV connector.
3. Measure the coil resistance between terminals A and B using a tester.
   - If it is not within the specification, replace the OCV.

**OCV resistance**
**6.9— 7.9 ohms [20°C {68°F}]**

4. Connect the OCV connector.
5. Connect the negative battery cable.

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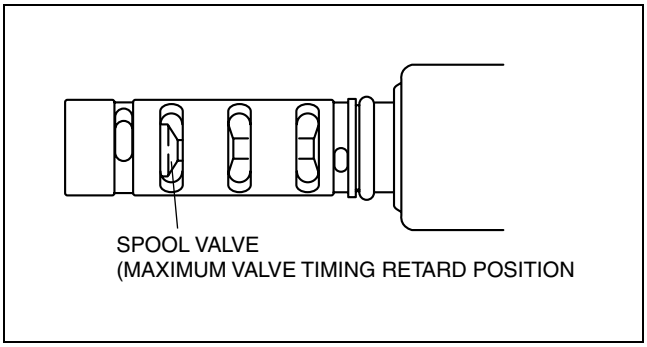
**Spool Valve Operation Inspection**

1. Disconnect the negative battery cable.
2. Disconnect the OCV connector.
3. Remove the OCV. (See01-10-29 OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION[L3 WITH TC].)
4. Verify that the spool valve in the OCV is in the maximum valve timing retard position as indicated in the figure.
   - If not as specified, replace the OCV.
5. Verify that the battery is fully charged.
   - If not as specified, recharge the battery.

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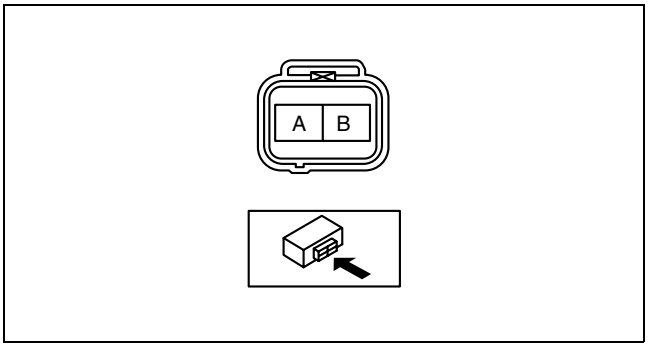
6. Apply battery positive voltage between the OCV terminals and verify that the spool valve operates and moves to the maximum valve timing advance position.
   - If not as specified, replace the OCV.

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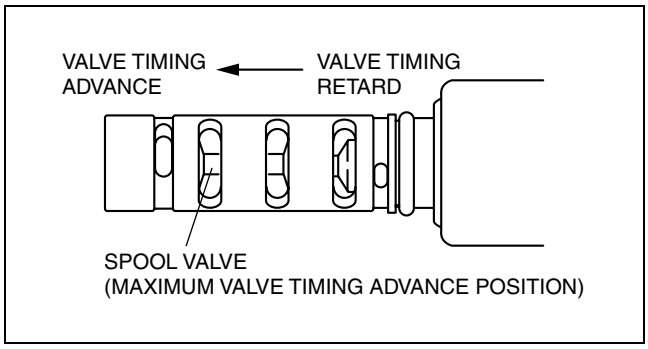
**Note**
- When applying battery positive voltage between the OCV terminals, the connection can be either of the following:
  — Positive battery cable to terminal A, Negative battery cable to terminal B
  — Positive battery cable to terminal B, Negative battery cable to terminal A

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7. Stop applying battery positive voltage and verify that the spool valve returns to the maximum valve timing retard position.
   - If not as specified, replace the OCV. (See01-10-29 OIL CONTROL VALVE (OCV) REMOVAL/ INSTALLATION[L3 WITH TC].)
8. Connect the OCV connector.
9. Connect the negative battery cable.

## ENGINE REMOVAL/INSTALLATION[L3 WITH TC]

id011039800400



**Warning**

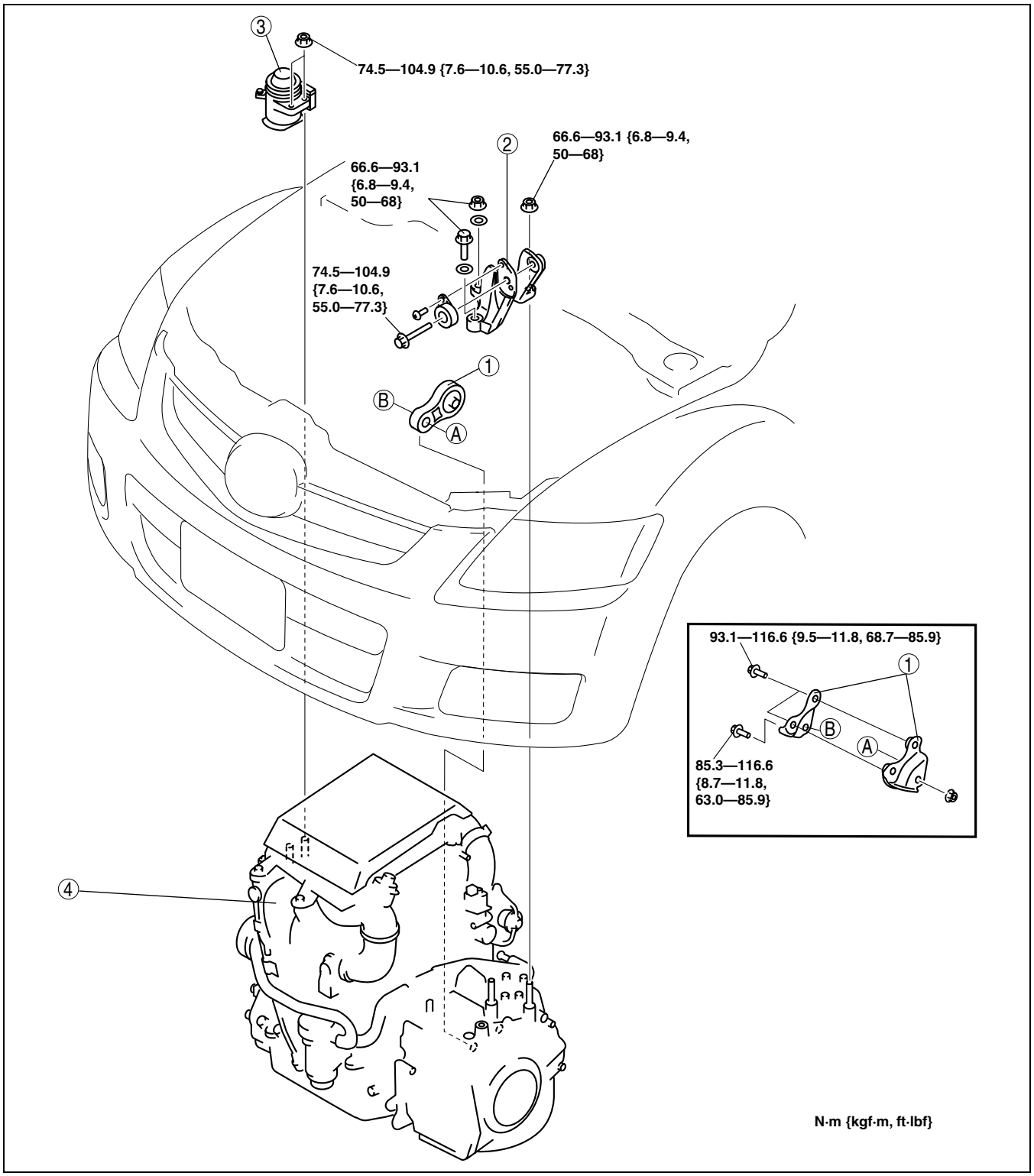
- **Fuel vapor is hazardous. It can very easily ignite, causing death, serious injury, or damage. Always keep sparks and flames away from fuel.'**
- **Fuel line spills and leakage from the pressurized fuel system are dangerous. Fuel can easily ignite and cause serious injury or death and damage. Fuel can also irritate skin and eyes. To prevent this, always perform the Fuel Line Safety Procedure. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**

1. Disconnect both battery cable.
2. Remove the battery and battery tray. (See01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the charge air cooler duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the air cleaner. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the front tire. (See02-12-4 WHEEL UNIT REMOVAL/INSTALLATION.
6. Remove the under cover, splash shield and mudguard.
7. Remove the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
8. Disconnect the heater hose. (See07-11-2 A/C UNIT REMOVAL/INSTALLATION.
9. Disconnect the radiator hose. (See01-12-8 RADIATOR REMOVAL/INSTALLATION[L3 WITH TC].
10. Disconnect the brake vacuum hose.
11. Disconnect the fuel hose and vacuum hose. (See 01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
12. Disconnect the selector cable from the transaxle side. (See05-18-7 SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION.)
13. Disconnect the wiring harnesses.
14. Drain the engine coolant (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
15. Drain the automatic transaxle fluid (ATF). (See05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
16. Remove the propeller shaft (AWD). (See03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
17. Remove the front pipe and rear HO2S. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
18. Disconnect the front drive shaft (RH) from the joint shaft side. (See03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
19. Disconnect the front drive shaft (LH) from the transaxle side. (See03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
20. Remove the A/C compressor with the pipes still connected. (See07-11-13 A/C COMPRESSOR REMOVAL/INSTALLATION.)

**Note**

- Position and secure the A/C compressor out of the way with rope.

21. Remove in the order indicated in the figure.
22. Install in the reverse order of removal.
23. Start the engine, and inspect and adjust the following:
    - Air bleeding (See 06-14-3 AIR BLEEDING.)
    - Front wheel alignment (See 02-11-2 FRONT WHEEL ALIGNMENT.)
    - Bleed the air from the cooling system. (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
    - Runout and contact on pulley and belt
    - Leakage of engine oil, engine coolant, automatic transmission fluid, or fuel.
    - Ignition timing, idle speed and idle mixture (CO and HC)
    - Engine accessories operation
24. Perform a road test and verify that there is no abnormal vibration or noise.

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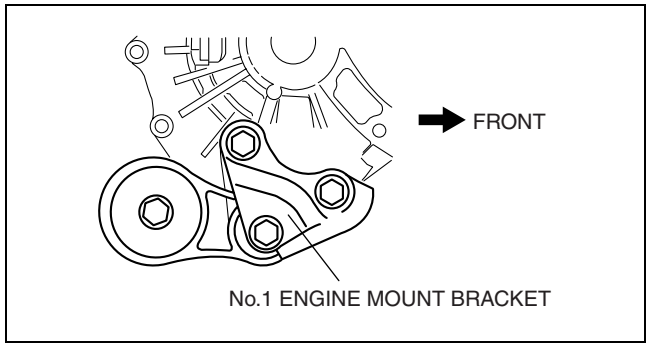
| | |
|---|---|
| 1 | No.1 engine mount<br>(See01-10-33 No.1 Engine Mount Removal Note.)<br>(See01-10-33 Engine Mount Installation Note.) |
| 2 | No.4 engine mount bracket<br>(See01-10-33 No.3 Engine Mount Rubber, No.4 Engine Mount Bracket Removal Note.)<br>(See01-10-33 Engine Mount Installation Note.) |
| 3 | No.3 engine mount rubber<br>(See01-10-33 No.3 Engine Mount Rubber, No.4 Engine Mount Bracket Removal Note.)<br>(See01-10-33 Engine Mount Installation Note.) |
| 4 | Engine and transaxle |

**No.1 Engine Mount Removal Note**

1. Remove the No.1 engine mount bracket from the underside of the vehicle.

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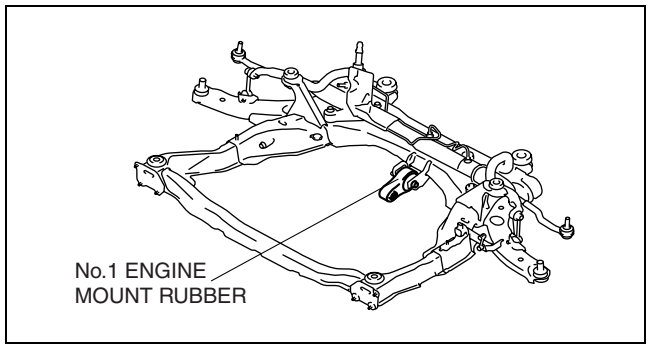
2. Remove the No.1 engine mount rubber and the front crossmember as a single unit. (See02-13-10 FRONT CROSSMEMBER REMOVAL/ INSTALLATION.)

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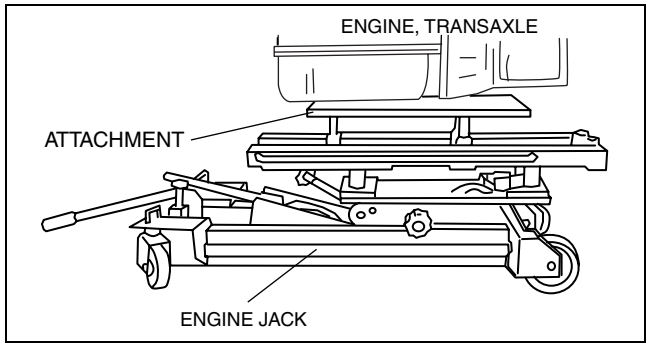
**No.3 Engine Mount Rubber, No.4 Engine Mount Bracket Removal Note**

1. Secure the engine and transaxle using an engine jack and attachment.

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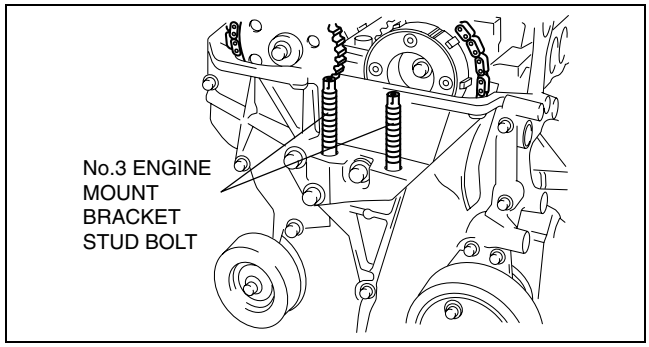
**Engine Mount Installation Note**

1. Tighten the No. 3 engine mount stud bolt.

   **Tightening torque**
   **7.0— 13 N·m {72— 132 kgf·cm, 62— 115 in·lbf}**

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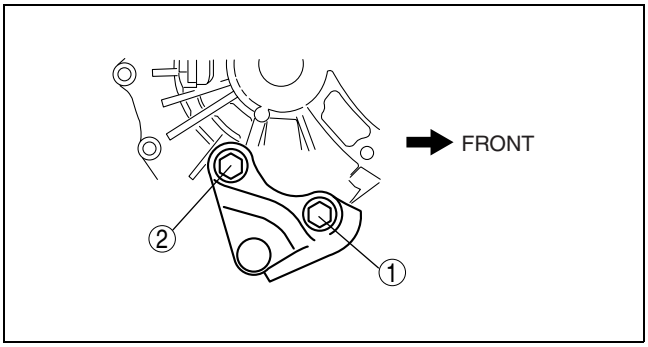
2. Tighten the No.1 engine mount bracket in the order shown in the figure.

   **Tightening torque**
   **93.1— 116.6 N·m {9.5— 11.8 kgf·m, 68.7— 85.9 ft·lbf}**



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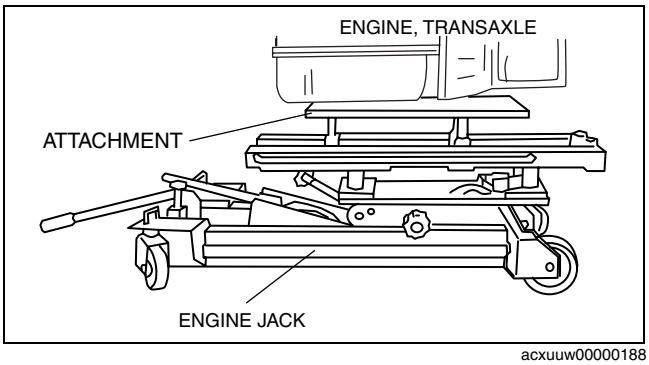
3. Secure the engine and transaxle using an engine jack and attachment.



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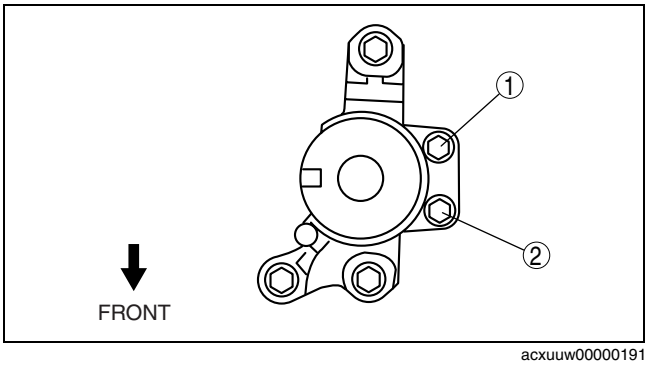
4. Temporarily tighten the No.3 engine mount nuts in the order shown in the figure.



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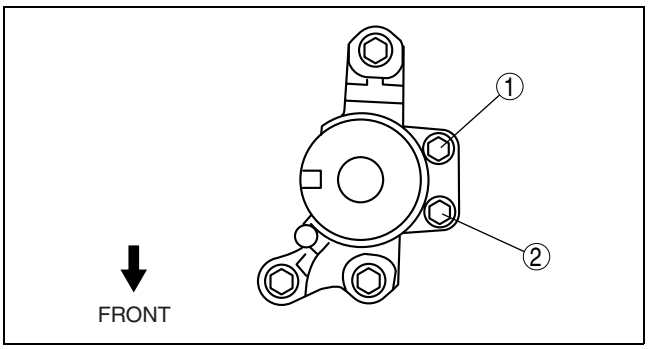
5. Tighten the No.3 engine mount nuts in the order shown in the figure.

   **Tightening torque**
   **74.5— 104.9 N·m {7.6— 10.6 kgf·m, 55.0— 77.3 ft·lbf}**



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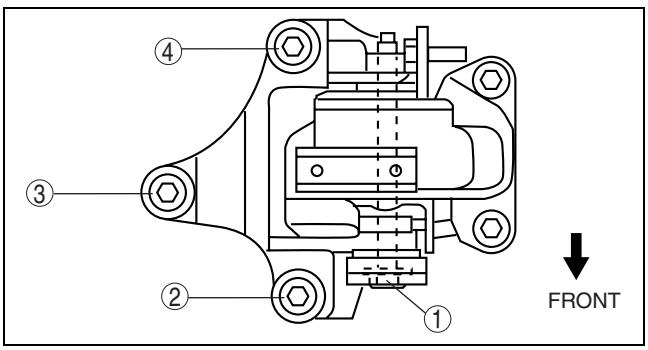
6. Temporarily tighten the No.4 engine mount bracket in the order shown in the figure.



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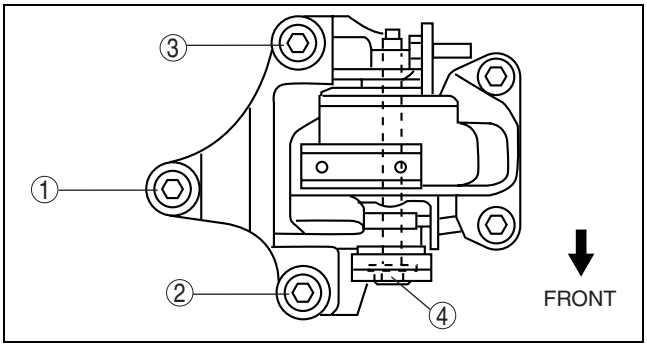
7. Tighten the No.4 engine mount bracket in the order shown in the figure.

**Tightening torque**

| Installation Position | Tightening Torque |
|---|---|
| 1—3 | 66.6— 93.1 N·m {6.8— 9.4 kgf·m, 50— 68 ft·lbf} |
| 4 | 74.5— 104.9 N·m {7.6— 10.6 kgf·m, 55.0— 77.3 ft·lbf} |

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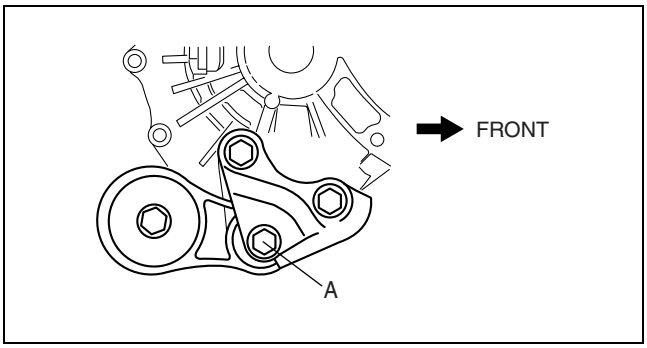
8. Tighten the No.1 engine mount bolt A shown in the figure

**Tightening torque**
**85.3— 116.6 N·m {8.7— 11.8 kgf·m, 63.0— 85.9 ft·lbf}**

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**ENGINE DISASSEMBLY/ASSEMBLY[L3 WITH TC]**

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1. Remove the engine from the transaxle. (See05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
2. Remove the intake-air system. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the exhaust system. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the generator. (See01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the starter. (See01-19-2 STARTER REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the crankshaft position (CKP) sensor. (See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
7. Install in the reverse order of removal.

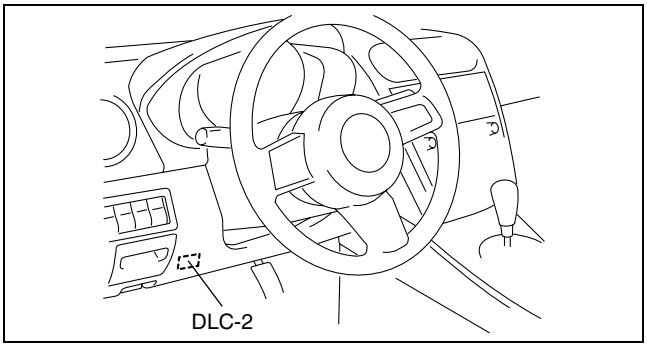
**ENGINE TUNE-UP[L3 WITH TC]**

id011039800600

**Note**
- If the accelerator pedal is depressed continuously for a specified time, the engine speed may decrease to the idle speed. This is due to the fuel cut control operation, which prevents overheating, and it does not indicate a malfunction.

**Engine Tune-up Preparation**

1. Verify that the selector lever is in P, N position.
2. Connect the M-MDS to the DLC-2.
3. Verify that no DTCs are available.
4. Warm up the engine (ECT is **approx. 80°C {176 °F} or more**).
5. Turn off the electrical loads.
6. Wait until the cooling fans stop.

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**Ignition Timing Inspection**

**Note**
- The ignition timing cannot be adjusted.
- The M-MDS is required to verify the ignition timing.

1. Verify the ignition timing (M-MDS: SPARKADV) using the PID/data monitor function of the M-MDS.

**Ignition timing**
**Approx. BTDC 10°**

2. Verify that ignition timing advances when the engine speed increases gradually.
   - If there is malfunction, refer to “ENGINE SYMPTOM TROUBLESHOOTING”. (See01-03-5 ENGINE SYMPTOM TROUBLESHOOTING[L3 WITH TC].)

**Idle Speed Inspection**

**Note**
- Idle speed is not adjustable.
- Idle speed verification requires M-MDS.

1. Verify that the idle speed (M-MDS: RPM PID) is within the specification using M-MDS.
   - If there is malfunction, refer to “ENGINE SYMPTOM TROUBLESHOOTING”. (See01-03-5 ENGINE SYMPTOM TROUBLESHOOTING[L3 WITH TC].)

**Idle speed (P, N position)**
**No load: 650— 750 rpm**
**Electrical load on*1: 650— 750 rpm**
**P/S operation: 650— 750 rpm**
**A/C operation: 650— 750 rpm**

**Idle speed (D position)**
**No load: 575— 675 rpm**
**Electrical load on*1: 600— 700 rpm**
**P/S operation: 650— 750 rpm**
**A/C operation: 650— 750 rpm**

*1 : When the following electrical loads are on: Headlights, rear defroster, cooling fan No.1, cooling fan No.2, and the blower motor (2-step or more.)

**Idle Mixture Inspection**
1. Verify that the idle speed and ignition timing are within the specification. (See01-10-36 Idle Speed Inspection.) (See01-10-36 Ignition Timing Inspection.)
2. Insert an exhaust gas analyzer to the tailpipe.
3. Verify that the CO and HC concentrations are within the regulation.

**Idle mixture**
**HC concentration: Within the regulation**
**CO concentration: Within the regulation**

# 01-11 LUBRICATION [L3 WITH TC]

**LUBRICATION SYSTEM**
**LOCATION INDEX[L3 WITH TC] . . . . . 01-11–1**
**OIL PRESSURE INSPECTION**
**[L3 WITH TC] . . . . . 01-11–2**
**ENGINE OIL LEVEL INSPECTION**
**[L3 WITH TC] . . . . . 01-11–3**
**ENGINE OIL REPLACEMENT**
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**[L3 WITH TC] . . . . . 01-11–5**
**OIL COOLER REMOVAL/INSTALLATION**
**[L3 WITH TC] . . . . . 01-11–6**
**OIL PAN REMOVAL/INSTALLATION**
**[L3 WITH TC] . . . . . 01-11–6**
Oil Pan Removal Note . . . . . 01-11–7
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**OIL PUMP REMOVAL/INSTALLATION**
**[L3 WITH TC] . . . . . 01-11–9**
Oil Pump Sprocket
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Oil Pump Installation Note. . . . . 01-11–10



## LUBRICATION SYSTEM LOCATION INDEX[L3 WITH TC]

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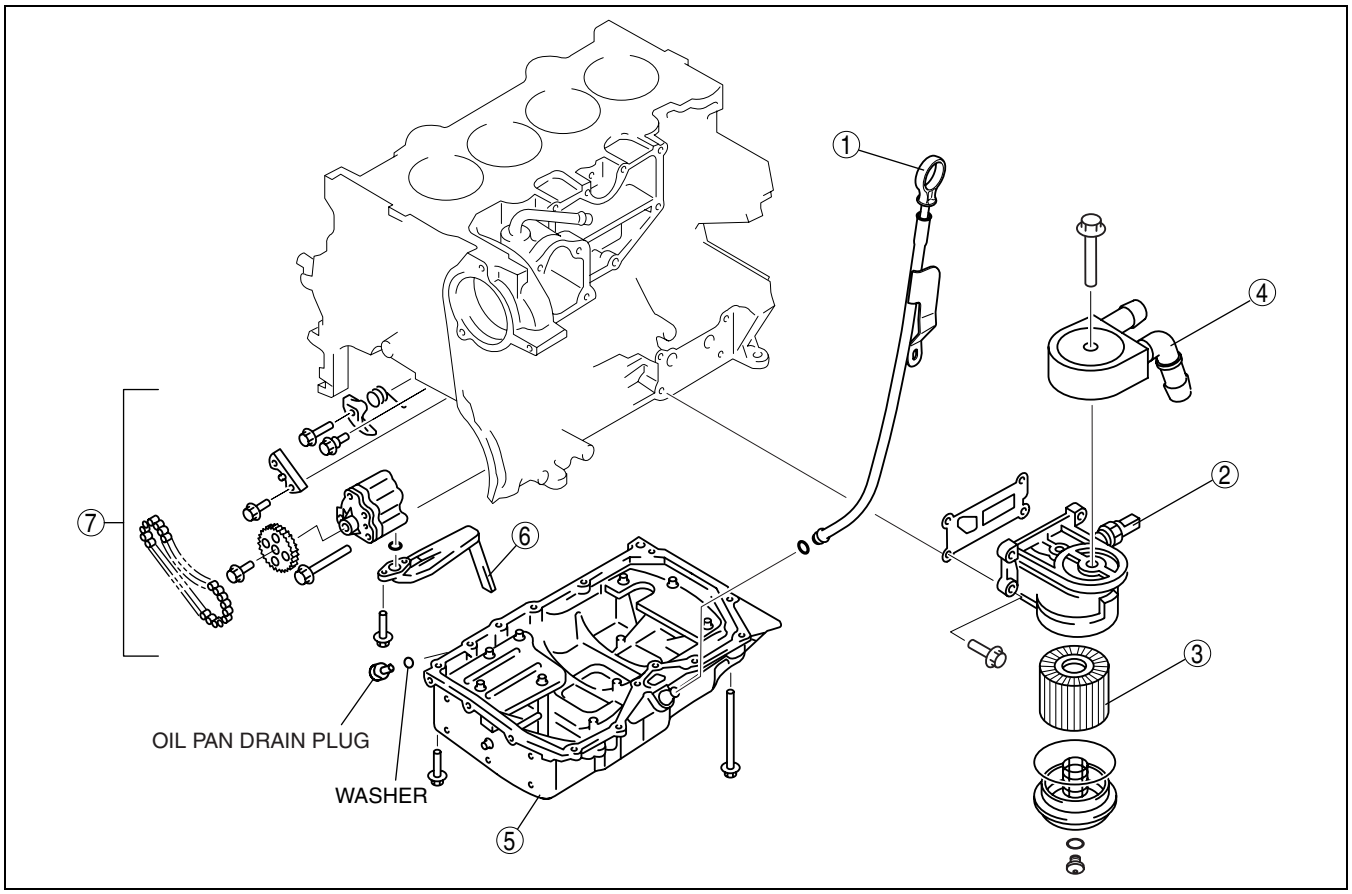


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| | |
|---|---|
| 1 | Dipstick<br>(See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)<br>(See 01-11-4 ENGINE OIL REPLACEMENT[L3 WITH TC].) |
| 2 | Oil pressure switch<br>(See 01-11-2 OIL PRESSURE INSPECTION[L3 WITH TC].) |
| 3 | Oil filter<br>(See 01-11-4 ENGINE OIL REPLACEMENT[L3 WITH TC].) |

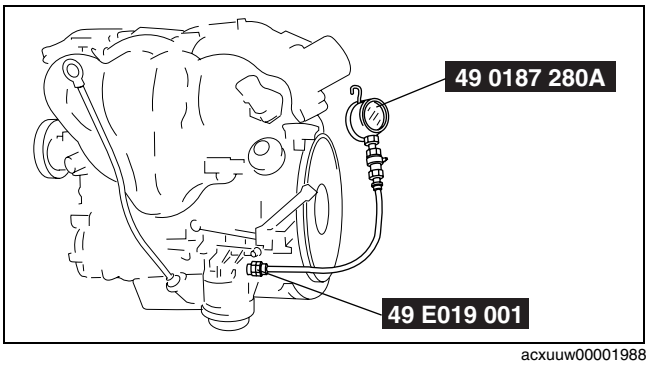
| | |
|---|---|
| 4 | Oil cooler<br>(See 01-11-6 OIL COOLER REMOVAL/INSTALLATION[L3 WITH TC].) |
| 5 | Oil pan<br>(See 01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].) |
| 6 | Oil strainer<br>(See 01-11-9 OIL PUMP REMOVAL/INSTALLATION[L3 WITH TC].) |
| 7 | Oil pump component<br>(See 01-11-9 OIL PUMP REMOVAL/INSTALLATION[L3 WITH TC].) |

## OIL PRESSURE INSPECTION[L3 WITH TC]

id011139800300

**Warning**
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove the oil pressure switch.
4. Screw the **SSTs** into the oil pressure switch installation hole.
5. Connect the negative battery cable.
6. Warm up the engine to normal operating temperature.
7. Run the engine at the specified speed, and note the gauge readings.
   - If not within the specification, inspect for the cause and repair or replace if necessary.



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**Note**
- The oil pressure can vary with oil viscosity and temperature.

**Oil pressure (reference value) [oil temperature: 100 °C {212 °F}]**
**297— 551 kPa {3.03— 5.61 kgf/cm$^2$, 43.1— 79.9 psi} [3,000 rpm]**

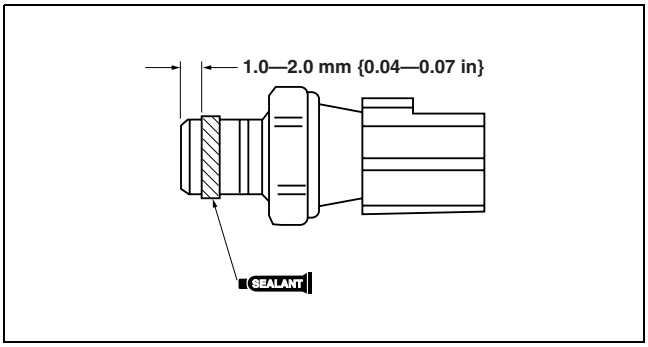
8. Stop the engine and wait until it is cool.
9. Disconnect the negative battery cable.
10. Remove the **SSTs.**

**Caution**
- **Make sure that there is no sealant between 1.0— 2.0 mm {0.04— 0.07 in} from the end of the oil pressure switch to prevent a possible operation malfunction.**

11. Apply silicone sealant to the oil pressure switch threads as shown in the figure.
12. Install the oil pressure switch.

**Tightening torque**
**12— 18 N·m {1.3— 1.8 kgf·m, 9— 13 ft·lbf}**

13. Connect the negative battery cable.
14. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
15. Install the under cover.



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## ENGINE OIL LEVEL INSPECTION[L3 WITH TC]

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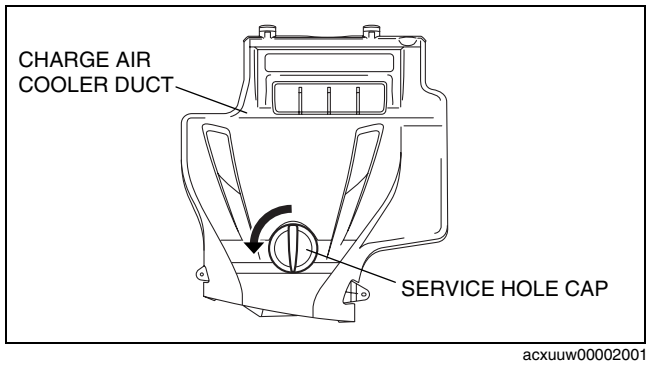
1. Position the vehicle on level ground.
2. Warm up the engine.
3. Stop the engine and allow **approx. 5 min** before continuing.
4. Rotate the service hole cap (installed to charge air cooler duct) used to remove/install the dipstick in the direction shown in the figure and remove it.

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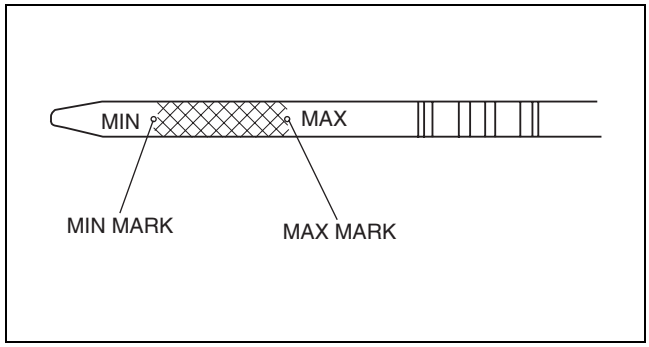
5. Remove the dipstick and verify that the oil level is between the MIN and MAX marks on the dipstick.
   - If the oil level is below the MIN mark, add engine oil.

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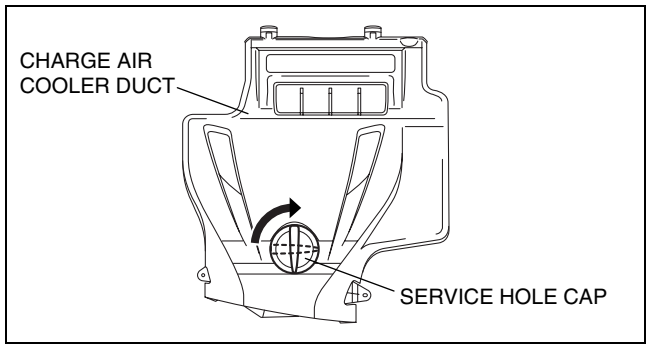
6. Install the service hole cap by rotating it in the direction shown in the figure.

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## ENGINE OIL REPLACEMENT[L3 WITH TC]

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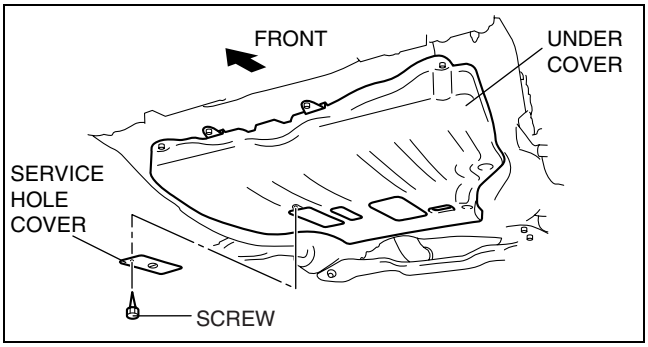
**Warning**
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

**Caution**
- **If engine oil is spilled on the exhaust system, wipe it off completely. If you fail to wipe the spilled engine oil, it will produce fumes because of the heat.**

1. Position the vehicle on level ground.
2. Remove the oil filler cap.
3. Remove the service hole cover (installed to under cover) used to drain the engine oil.
4. Remove the oil pan drain plug.
5. Drain the engine oil into a container.
6. Install the oil pan drain plug with a new washer.

**Oil pan drain plug tightening torque**
**30— 41 N·m {3.1— 4.1 kgf·m, 23— 30 ft·lbf}**

**Note**
- The amount of residual oil in the engine can vary according to factors such as the replacement method and oil temperature. Verify the oil level after engine oil replacement.



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7. Refill with the following type and amount of the engine oil.

**Engine oil capacity (approx. quantity)**
**Oil replacement: 5.3 L {5.6 US qt, 4.7 Imp qt}**
**Oil and oil filter replacement: 5.7 L {6.0 US qt, 5.0 Imp qt}**
**Total (dry engine): 6.4 L {6.8 US qt, 5.6 Imp qt}**

**Engine oil specification**

| Item | U.S.A. and CANADA | Except U.S.A. and CANADA |
|---|---|---|
| Engine oil grade | (ILSAC) | API SL or ILSAC<br>(ILSAC) |
| Engine oil viscosity | 5W-30 | |

8. Install the oil filler cap.
9. Start the engine and confirm that there is no oil leakage.
   - If there is oil leakage, repair or replace the applicable part.
10. Inspect the oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
11. Install the service hole cover.

## OIL FILTER REPLACEMENT[L3 WITH TC]

id011139800700



**Warning**

- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

**Caution**

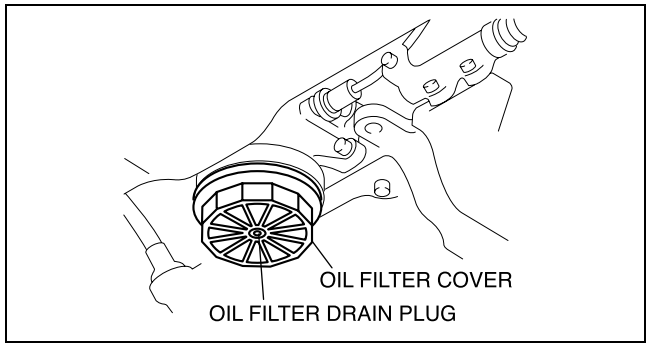
- **If engine oil is spilled on the exhaust system, wipe it off completely. If you fail to wipe the spilled engine oil, it will produce fumes because of the heat.**
- **To avoid damage to the oil filter, use only specified oil filter.**

1. Remove the under cover.
2. Loosen the oil filter drain plug. (Do not remove.)
3. Loosen the filter cover for 1 turn using a commercially available, cup-type oil filter wrench **(74 mm {2.9 in} diameter, 14 sided).**
4. Remove the oil filter drain plug, and drain the engine oil.

**Note**

- Oil could be easily drained when the air is in the filter.

5. Loosen the oil filter cover for another 1 turn.

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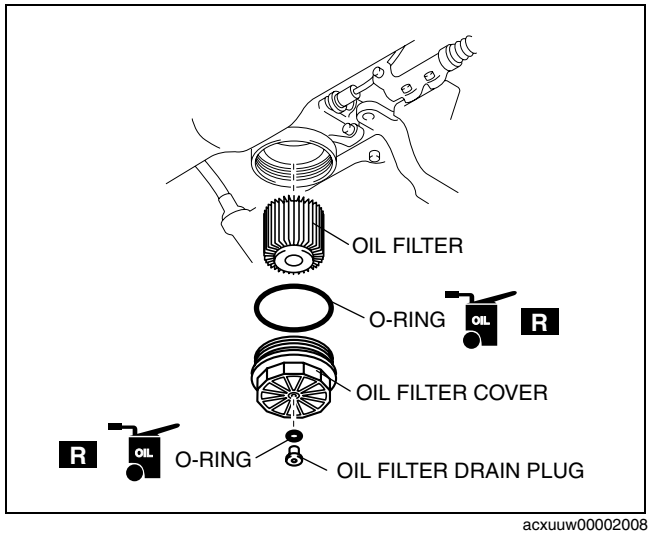
6. Remove the oil filter cover and the oil filter.
7. Use a clean rag to wipe off the mounting surface on the oil filter adapter and the oil filter cover.
8. Apply clean engine oil to a new O-ring of the oil filter cover.
9. Apply clean engine oil to a new O-ring of the oil filter drain plug.
10. Install the oil filter, oil filter drain plug, and oil filter cover.
11. Tighten the oil filter cover and the oil filter drain plug.

**Tightening torque**
**Oil filter cover: 30— 35 N·m {3.1— 3.5 kgf·m, 22.2— 25.8 ft·lbf}**
**Oil filter drain plug: 9— 11 N·m {91.8— 112.2 kgf·cm, 79.6— 97.2 in·lbf}**

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12. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
13. Inspect the oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
14. Install the under cover.

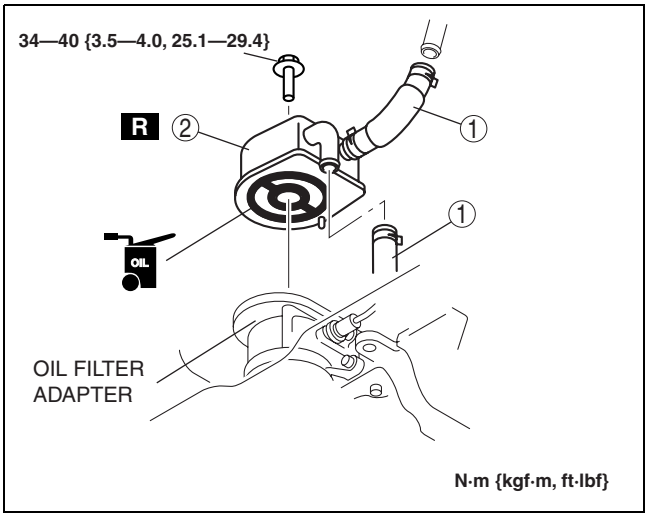
## OIL COOLER REMOVAL/INSTALLATION[L3 WITH TC]

id011139800800

**Warning**
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
4. Remove in the order indicated in the table.
5. Use a clean rag to wipe off the mounting surface on the oil filter adapter and the oil cooler.
6. Install in the reverse order of the removal.
7. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
8. Start the engine and confirm that there is no oil leakage.
   - If there is oil leakage, repair or replace the applicable part.
9. Inspect the oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)

| | |
|---|---|
| 1 | Water hose |
| 2 | Oil cooler |

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## OIL PAN REMOVAL/INSTALLATION[L3 WITH TC]

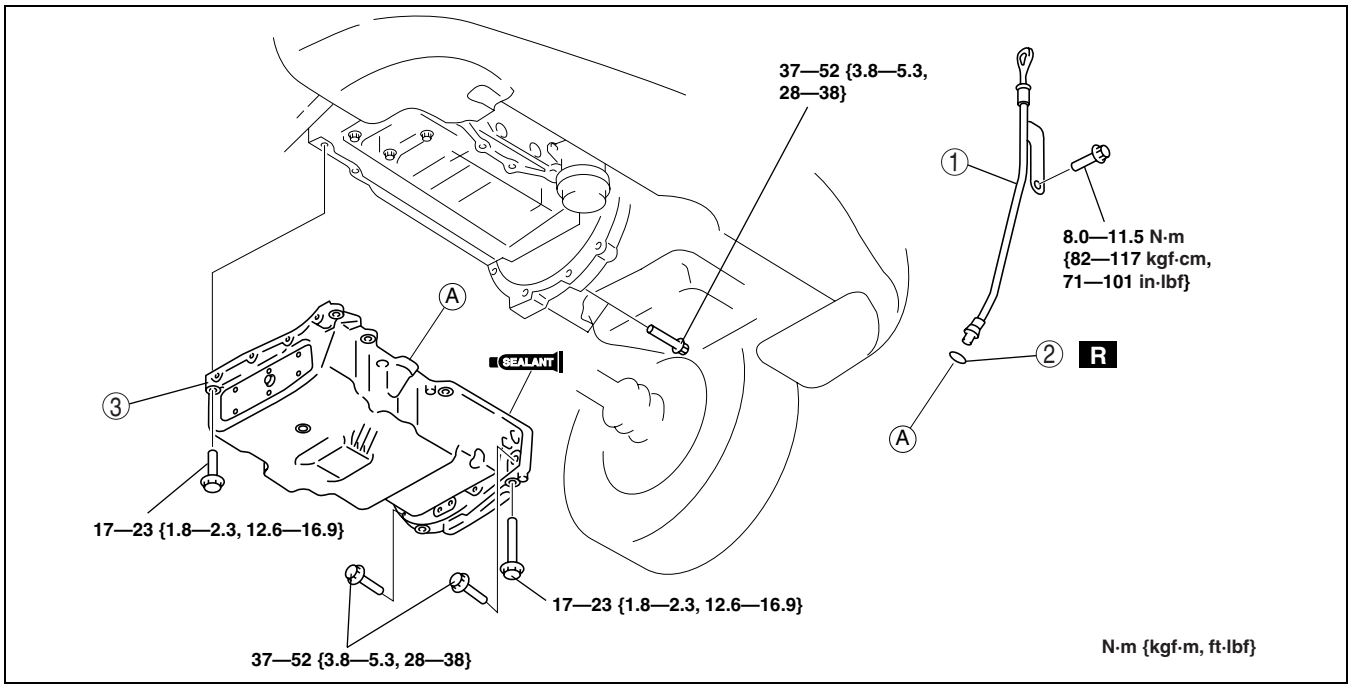
id011139800200

**Warning**
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Remove the splash shield (RH).
5. Drain the engine oil. (See 01-11-4 ENGINE OIL REPLACEMENT[L3 WITH TC].)
6. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
7. Remove the charge air cooler, air cleaner and fresh air duct component, and air hose. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
8. Disconnect the quick release connector on the high pressure fuel pump. (See 01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
9. Remove the high pressure fuel pump. (See 01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)

10. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
11. Loosen the water pump pulley bolts before removing the drive belt.
12. Remove the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
13. Remove the P/S oil pump with hose and pipe still connected. Position the P/S oil pump out of the way. (See 06-14-21 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
14. Remove the crankshaft position (CKP) sensor. (See 01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
15. Remove the engine front cover. (See 01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
16. Remove in the order indicated in the table.
17. Install in the reverse order of removal.
18. Refill with the specified type and amount of the engine oil. (See 01-11-4 ENGINE OIL REPLACEMENT[L3 WITH TC].)
19. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
20. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
21. Inspect the oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
22. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)
23. Inspect for the ignition timing and idle speed. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)



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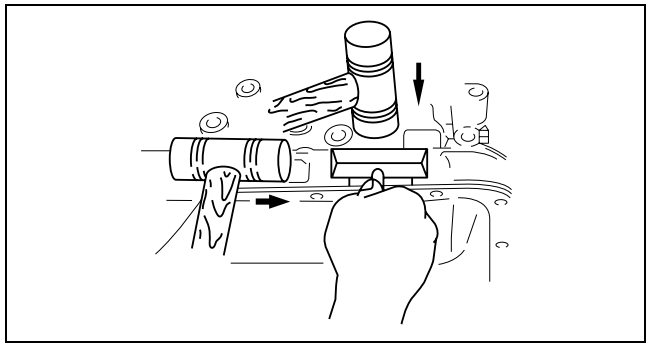
| | |
|---|---|
| 1 | Dipstick pipe |
| 2 | O-ring |

| | |
|---|---|
| 3 | Oil pan<br>(See 01-11-7 Oil Pan Removal Note.)<br>(See 01-11-8 Oil Pan Installation Note.) |

**Oil Pan Removal Note**

1. Remove the oil pan using a separator tool.



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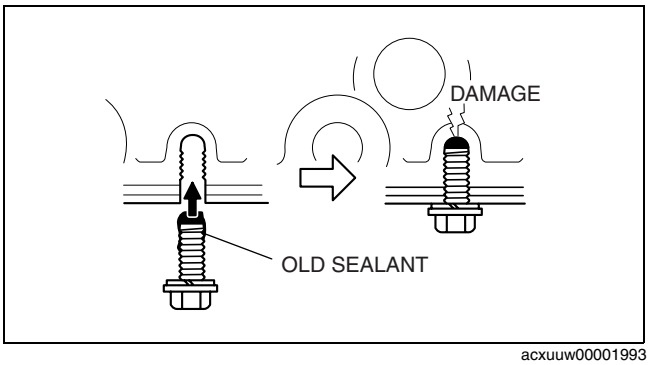
**Oil Pan Installation Note**

**Caution**
- **Apply the silicon sealant in a single, unbroken line around the whole perimeter.**
- **Using bolts with the old seal adhering could cause cracks in the housing.**

1. Completely clean and remove any oil, dirt, sealant or other foreign material that may be adhering to the housing and oil pan.
2. When reusing the oil pan installation bolts, clean any old sealant from the bolts.

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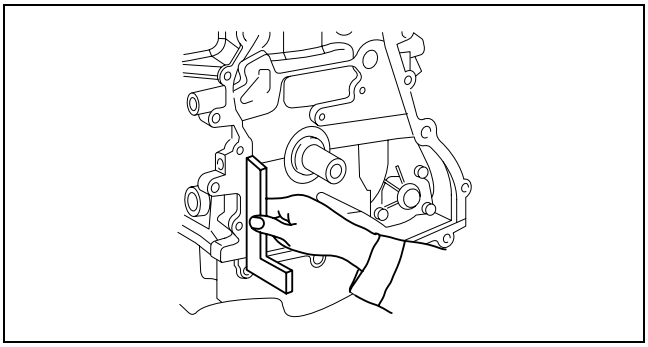
3. Use a square ruler to align the oil pan and the cylinder block junction side on the engine front cover side.



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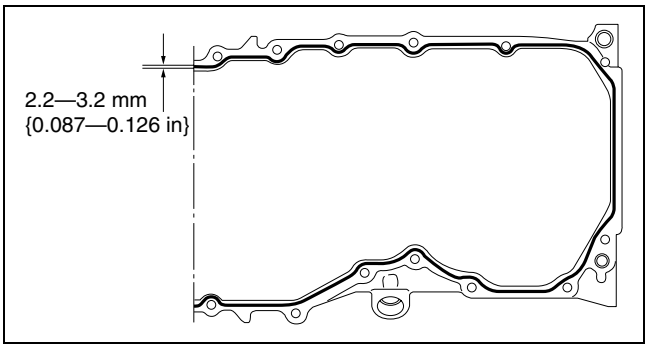
4. Apply silicone sealant to the oil pan along the inside of the bolt holes as shown in the figure.

   **Thickness**
   **2.2— 3.2 mm {0.087— 0.126 in}**

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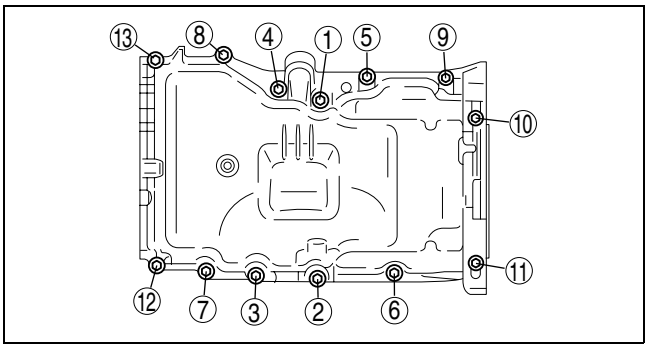
5. Tighten the bolts in the order shown in the figure.

   **Tightening torque**
   **17— 23 N·m {1.8— 2.3 kgf·m, 12.6— 16.9 ft·lbf}**

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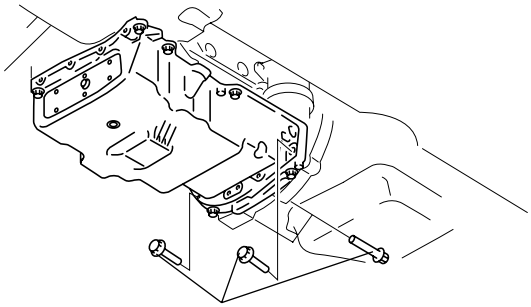
6. Tighten the oil pan-transaxle installation bolts.

**Tightening torque**
**37— 52 N·m {3.8— 5.3 kgf·m, 28— 38 ft·lbf}**


OIL PAN-TRANSAXLE INSTALLATION BOLTS

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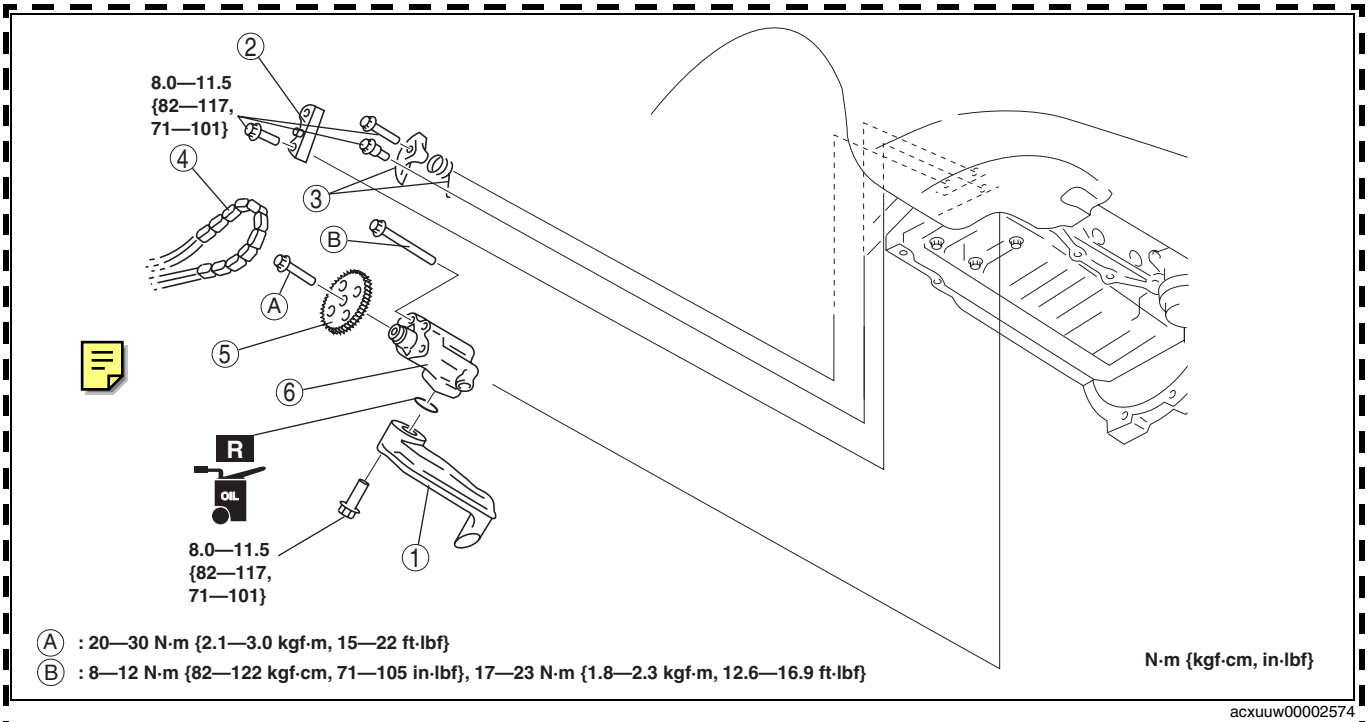
## OIL PUMP REMOVAL/INSTALLATION[L3 WITH TC]

id011139800600

**Warning**
- **Hot engines and engine oil can cause severe burns. Turn off the engine and wait until it and the engine oil have cooled.**
- **A vehicle that is lifted but not securely supported on safety stands is dangerous. It can slip or fall, causing death or serious injury. Never work around or under a lifted vehicle if it is not securely supported on safety stands.**
- **Continuous exposure to USED engine oil has caused skin cancer in laboratory mice. Protect your skin by washing with soap and water immediately after working with engine oil.**

1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Remove the splash shield (RH).
5. Drain the engine oil. (See 01-11-4 ENGINE OIL REPLACEMENT[L3 WITH TC].)
6. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
7. Remove the charge air cooler, air cleaner and fresh air duct component, and air hose. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
8. Disconnect the quick release connector on the high pressure fuel pump. (See 01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
9. Remove the high pressure fuel pump. (See 01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/ INSTALLATION[L3 WITH TC].)
10. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
11. Loosen the water pump pulley bolts before removing the drive belt.
12. Remove the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
13. Remove the P/S oil pump with hose and pipe still connected. Position the P/S oil pump out of the way. (See 06-14-21 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
14. Remove the crankshaft position (CKP) sensor. (See 01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
15. Remove the engine front cover. (See 01-10-10 TIMING CHAIN REMOVAL/INSTALLATION[L3 WITH TC].)
16. Remove the oil pan. (See 01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].)
17. Remove in the order indicated in the table.
18. Install in the reverse order of removal.
19. Refill with the specified type and amount of the engine oil. (See 01-11-4 ENGINE OIL REPLACEMENT[L3 WITH TC].)
20. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
21. Start the engine and confirm that there is no oil leakage.
    - If there is oil leakage, repair or replace the applicable part.
22. Inspect the oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
23. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)
24. Inspect for the ignition timing and idle speed. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)
25. Inspect the oil pressure. (See 01-11-2 OIL PRESSURE INSPECTION[L3 WITH TC].)

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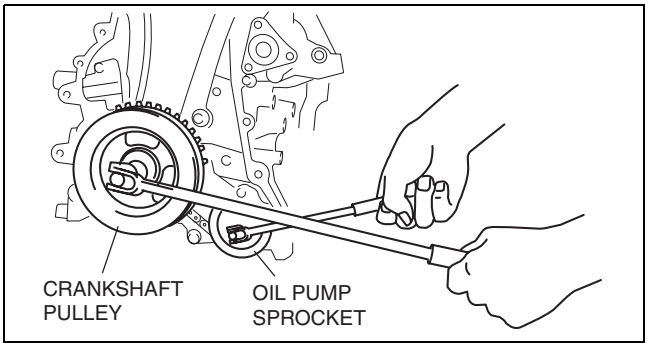
| | |
|---|---|
| 1 | Oil strainer |
| 2 | Oil pump chain guide |
| 3 | Oil pump chain tensioner |
| 4 | Oil pump chain |
| 5 | Oil pump sprocket (See 01-11-10 Oil Pump Sprocket Removal/ Installation Note.) |
| 6 | Oil pump (See 01-11-10 Oil Pump Installation Note.) |

**Oil Pump Sprocket Removal/Installation Note**

1. Temporarily install the crankshaft pulley and crankshaft pulley lock bolt to the crankshaft, and lock the oil pump against rotation as shown in figure.
2. Remove/install the oil pump sprocket, and then remove the crankshaft pulley and crankshaft pulley lock bolt.

**Tightening torque**
**20—30 N·m {2.1—3.0 kgf·m, 15—22 ft·lbf}**

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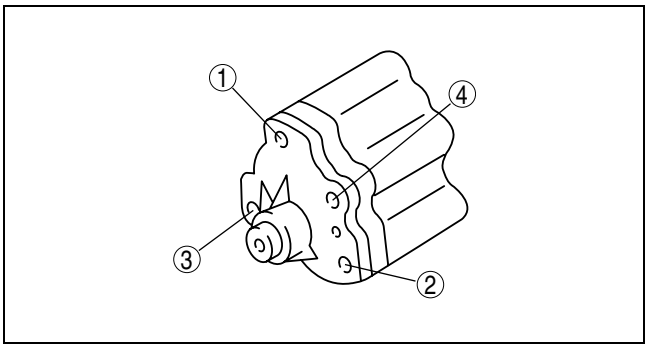
**Oil Pump Installation Note**

1. Tighten the oil pump bolts in two steps in the order shown in the figure.

**Tightening torque**
**Step 1: 8— 12 N·m {82— 122 kgf·cm, 71— 105 in·lbf}**
**Step 2: 17— 23 N·m {1.8— 2.3 kgf·m, 12.6— 16.9 ft·lbf}**

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# 01-12 COOLING SYSTEM [L3 WITH TC]

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**ENGINE COOLANT PROTECTION INSPECTION[L3 WITH TC] . . . . . 01-12–4**
**ENGINE COOLANT REPLACEMENT [L3 WITH TC] . . . . . 01-12–5**
**ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC] . . . . . 01-12–6**
**COOLING SYSTEM CAP INSPECTION [L3 WITH TC] . . . . . 01-12–7**
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**FAN CONTROL MODULE INSPECTION [L3 WITH TC] . . . . . 01-12–14**

## COOLING SYSTEM LOCATION INDEX[L3 WITH TC]

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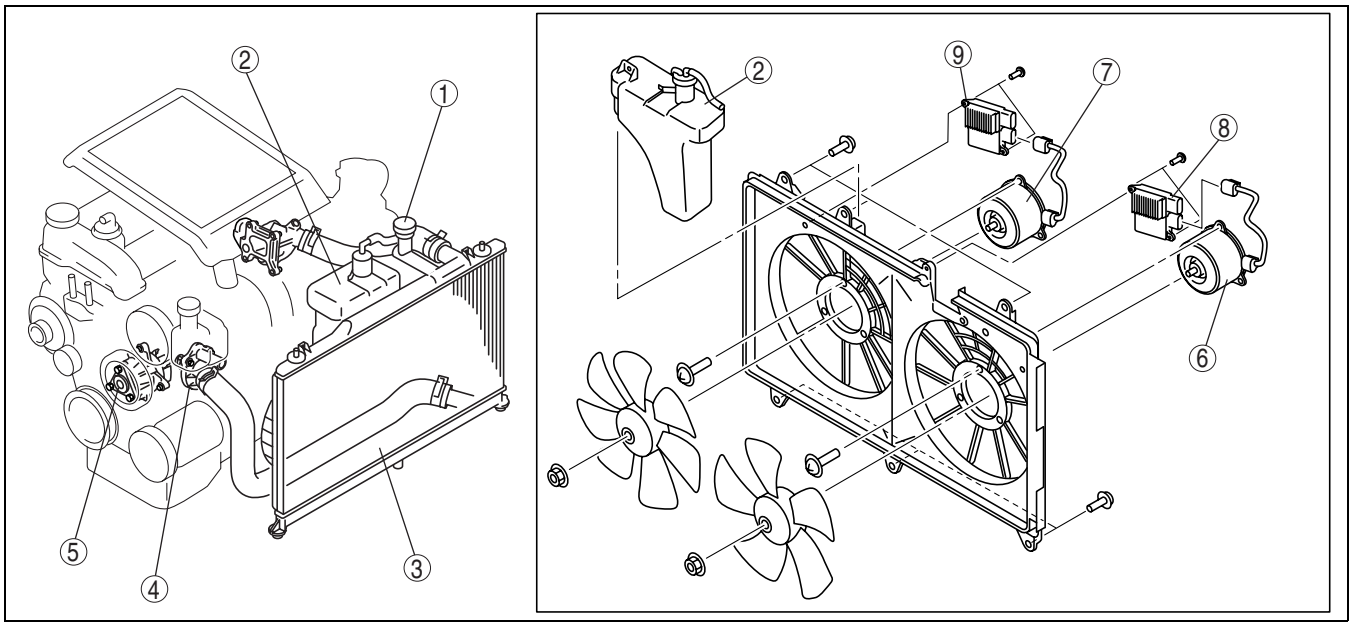


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| | |
|---|---|
| 1 | Cooling system cap<br>(See 01-12-7 COOLING SYSTEM CAP INSPECTION[L3 WITH TC].) |
| 2 | Coolant reserve tank<br>(See 01-12-3 ENGINE COOLANT LEVEL INSPECTION[L3 WITH TC].)<br>(See 01-12-7 COOLANT RESERVE TANK REMOVAL/INSTALLATION[L3 WITH TC].) |
| 3 | Radiator<br>(See 01-12-4 ENGINE COOLANT PROTECTION INSPECTION[L3 WITH TC].)<br>(See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)<br>(See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)<br>(See 01-12-8 RADIATOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 4 | Thermostat<br>(See 01-12-11 THERMOSTAT REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-12-11 THERMOSTAT INSPECTION[L3 WITH TC].) |
| 5 | Water pump<br>(See 01-12-12 WATER PUMP REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 6 | Cooling fan motor No.1<br>(See 01-12-12 FAN MOTOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-12-14 FAN MOTOR INSPECTION[L3 WITH TC]01-12-14 FAN MOTOR INSPECTION[L3 WITH TC].) |
| 7 | Cooling fan motor No.2<br>(See 01-12-12 FAN MOTOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-12-14 FAN MOTOR INSPECTION[L3 WITH TC].) |
| 8 | Fan control module No.1<br>(See 01-12-14 FAN CONTROL MODULE INSPECTION[L3 WITH TC].) |
| 9 | Fan control module No.2<br>(See 01-12-14 FAN CONTROL MODULE INSPECTION[L3 WITH TC].) |

## COOLING SYSTEM SERVICE WARNINGS[L3 WITH TC]

id011239800200

**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

- **Depending on the vehicle, the cooling fan may operate suddenly even when the ignition switch is turned off. Therefore, keep hands and tools away from the cooling fan even if the cooling fan is not operating to prevent injury to personnel or damage to the cooling fan. Always disconnect the negative battery cable when servicing the cooling fan or parts near the cooling fan.**

## ENGINE COOLANT LEVEL INSPECTION[L3 WITH TC]

id011239800300

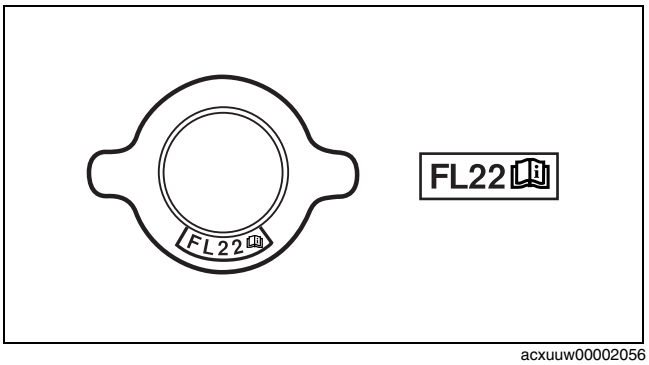


**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

**Note**

- If the “FL22” mark is shown on or near the cooling system cap, use FL22 type engine coolant.
- FL22 type engine coolant is shipped as a diluted solution (55% coolant, 45% water). Use the solution as is when replacing coolant.

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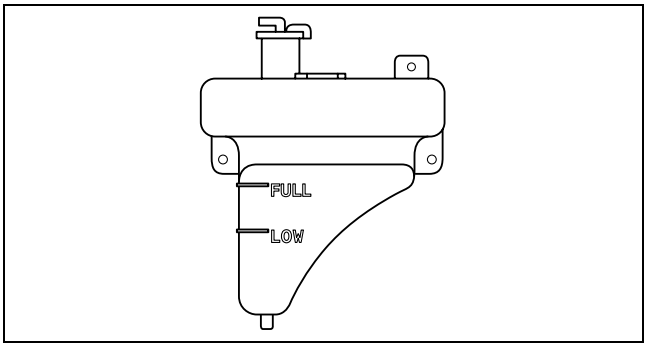
1. Remove the cooling system cap.
2. Verify that the engine coolant is filled close to the top of the radiator filler neck.
   - If the engine coolant level is low, add engine coolant.
3. Verify that the engine coolant level in the coolant reserve tank is between the FULL and LOW marks.
   - If the engine coolant level is below the LOW mark, add engine coolant.

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## ENGINE COOLANT PROTECTION INSPECTION[L3 WITH TC]

id011239800400

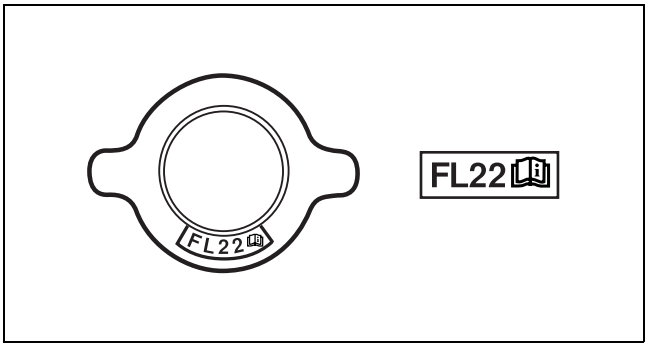
1. Measure the engine coolant temperature and specific gravity using a thermometer and a hydrometer.

**Caution**

- **Use engine coolant at a concentration that meets the environmental conditions in which the vehicle is driven, otherwise engine damage could occur.**
- **The engine has aluminum parts and must be protected by an ethylene-glycol-based coolant to prevent corrosion and freezing.**
- **Do not use coolants containing Alcohol, Methanol, Borate or Silicate. These coolants could damage the cooling system.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**
- **Engine coolant damages paint. If engine coolant does get on a painted surface, rinse it off quickly.**

**Note**

- If the "FL22" mark is shown on or near the cooling system cap, use FL22 type engine coolant.
- FL22 type engine coolant is shipped as a diluted solution (55% coolant, 45% water). Use the solution as is when replacing coolant.

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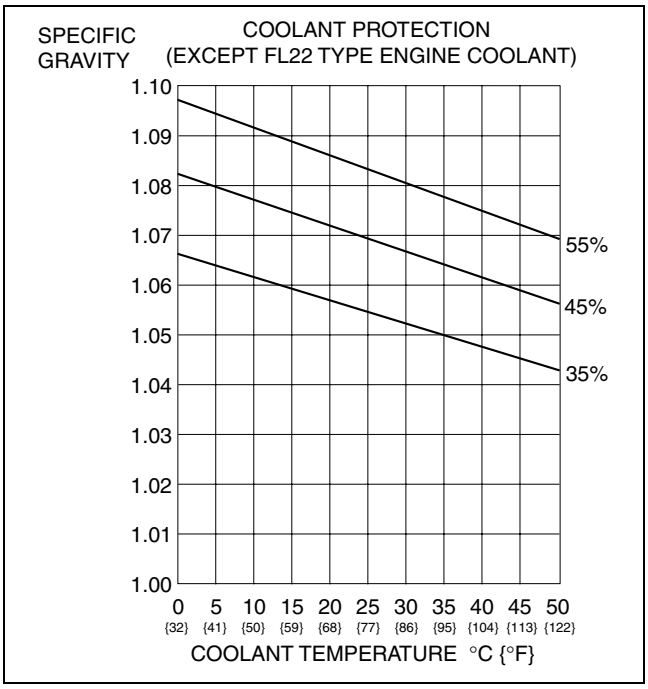
2. Determine the engine coolant protection level by referring to the graph shown in the figure.
   - If the engine coolant protection level is not correct, add water or engine coolant.

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## ENGINE COOLANT REPLACEMENT[L3 WITH TC]

id011239800600



**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

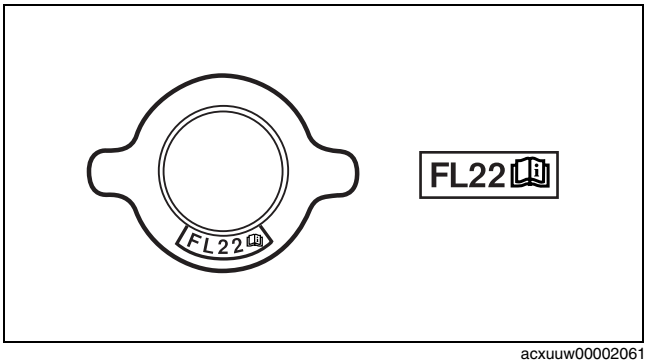
**Caution**

- **Use engine coolant at a concentration that meets the environmental conditions in which the vehicle is driven, otherwise engine damage could occur.**
- **The engine has aluminum parts and must be protected by an ethylene-glycol-based coolant to prevent corrosion and freezing.**
- **Do not use coolants containing Alcohol, Methanol, Borate or Silicate. These coolants could damage the cooling system.**
- **Use only soft (demineralized) water in the coolant mixture. Water that contains minerals will cut down on the coolant's effectiveness.**
- **Engine coolant damages paint. If engine coolant does get on a painted surface, rinse it off quickly.**

**Note**

- If the “FL22” mark is shown on or near the cooling system cap, use FL22 type engine coolant.
- FL22 type engine coolant is shipped as a diluted solution (55% coolant, 45% water). Use the solution as is when replacing coolant.

**Engine coolant capacity (approx. quantity)**
**9.0 L {9.5 US qt, 7.9 Imp qt}**

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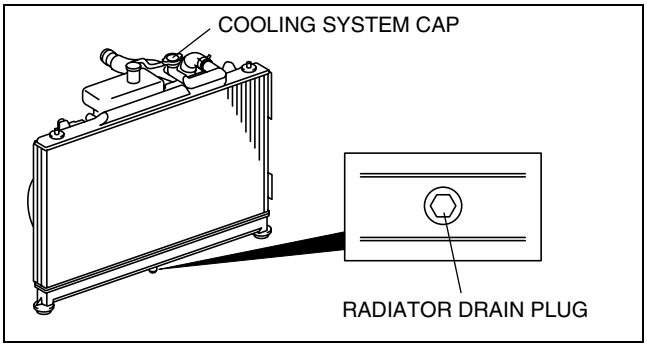
1. Remove the cooling system cap.
2. Remove the radiator drain plug and drain the engine coolant into a container.
3. Flush the cooling system with water until all traces of color are gone.
4. Let the system drain completely.
5. Tighten the radiator drain plug with a new gasket.

**Tightening torque**
**1.5— 2.4 N·m {15— 25 kgf·cm, 13— 21 in·lbf}**

6. Referring to the following chart, select the correct volume percentage of the water and engine coolant.

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**Antifreeze solution mixture percentage (Except FL22 type engine coolant)**

| Engine coolant protection | Volume percentage (%) | | Gravity at 20 °C {68 °F} |
|---|---|---|---|
| | Water | Coolant | |
| Above -16 °C {3 °F} | 65 | 35 | 1.057 |
| Above -26 °C {-15 °F} | 55 | 45 | 1.072 |
| Above -40 °C {-40 °F} | 45 | 55 | 1.086 |

7. Refill the engine coolant from the radiator filler neck until it is close to the top of the radiator filler neck.
8. Refill the engine coolant into the coolant reserve tank up to the FULL mark on the tank.
9. Install the cooling system cap.

**Caution**
- **If the water temperature gauge rises too high, stop the engine and decrease the engine coolant temperature to prevent overheating. Then, verify the malfunctioning part and repair or replace it.**

10. Start the engine and warm up the engine by idling.
11. After the engine warms up, perform the following steps. At this time, be careful of the engine coolant temperature to prevent overheating.

**Note**
- If the accelerator pedal is depressed continuously for a specified time, the engine speed may decrease to the idle speed. This is due to the fuel cut control operation, which prevents overheating, and it does not indicate a malfunction.

(1) Run the engine at **approx. 5,000 rpm** for **1 min**.
(2) Run the engine at idle for **5 s**.
(3) Repeat steps (1), (2) several times.
(4) Operate the heater at the maximum temperature and airflow, and verify that hot air blows from vent.

12. Stop the engine, and inspect the engine coolant level after the engine coolant temperature decreases. If it is low, repeat steps 7— 11.
13. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)

**ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC]**

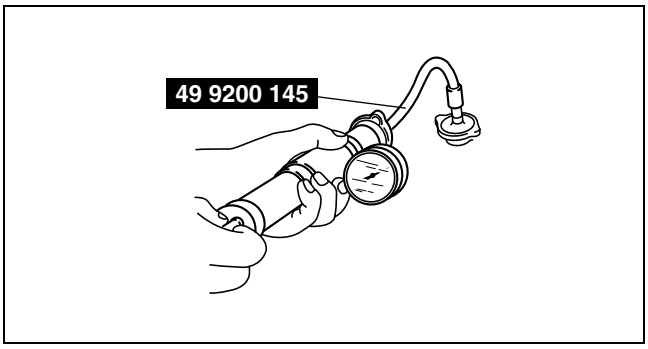
id011239800500

**Warning**
- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Inspect the engine coolant level. (See 01-12-3 ENGINE COOLANT LEVEL INSPECTION[L3 WITH TC].)
2. Remove the cooling system cap.
3. Install the **SST** and a radiator cap tester to the radiator filler neck.
4. Apply pressure using the radiator cap tester.

**Caution**
- **Applying more than 142.2 kPa {1.45 kgf/cm$^2$, 20.6 psi} can damage the hoses, fittings, and other components, and cause leakage.**

**Pressure**
**142.2 kPa {1.45 kgf/cm$^2$, 20.6 psi} [1 min]**

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5. When pressurizing the cooling system, verify that the pressure is maintained.
   - If the gauge needle drops, it may indicate water leakage. Repair or replace the applicable part.

## COOLING SYSTEM CAP INSPECTION[L3 WITH TC]

id011239801500

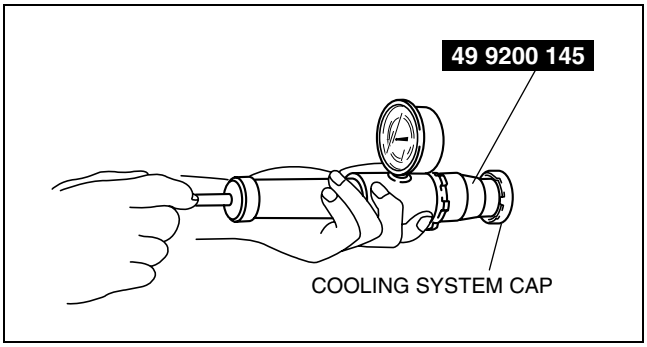
**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Clean the cooling system cap and the sealed part.
2. Inspect the cooling system cap for cracks or everted seal.
   - If there is any malfunction, replace the cooling system cap.
3. Attach the cooling system cap to the **SST** and a radiator cap tester.
4. Hold the cooling system cap downward and apply pressure gradually. Verify that the pressure is held stable for **10 s.**
   - If the pressure is not held stable, replace the cooling system cap.

**Cooling system cap valve opening pressure**

**112.8— 142.2 kPa {1.15— 1.45 kgf/cm$^2$, 16.4— 20.6 psi}**

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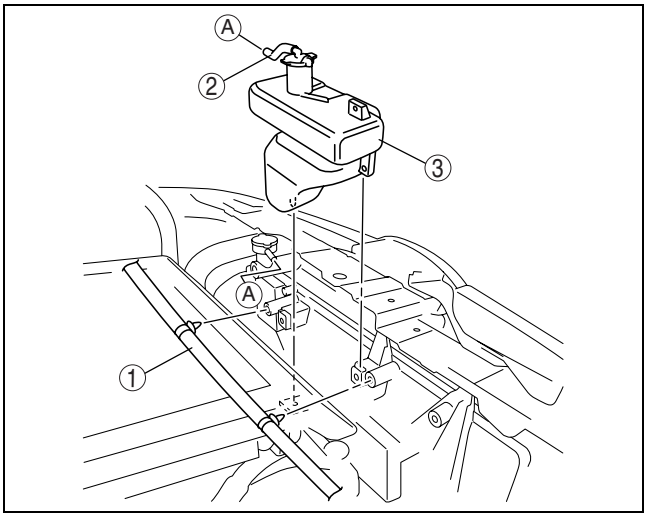
## COOLANT RESERVE TANK REMOVAL/INSTALLATION[L3 WITH TC]

id011239801000

1. Remove the charge air cooler duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal..

| | |
|---|---|
| 1 | Wiring harness |
| 2 | Hose |
| 3 | Coolant reserve tank<br>(See 01-12-8 Coolant Reserve Tank Removal Note.) |

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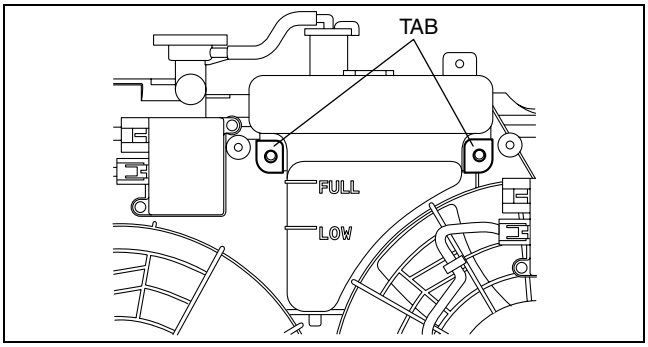
**Coolant Reserve Tank Removal Note**

1. Remove the coolant reserve tank from the radiator cowling tabs shown in the figure by lifting them with a flathead screwdriver.

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**RADIATOR REMOVAL/INSTALLATION[L3 WITH TC]**

id011239801400

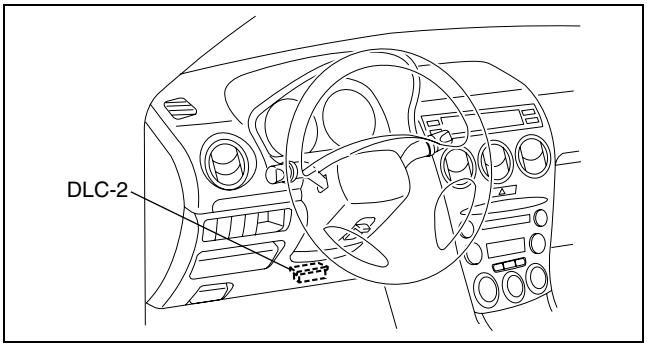
**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
3. Remove the charge air cooler duct, air cleaner and fresh air duct component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the coolant reserve tank. (See 01-12-7 COOLANT RESERVE TANK REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the dipstick pipe. (See 01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the cooling fan component. (See 01-12-12 FAN MOTOR REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove the under cover.
8. Disconnect the ATF oil cooler hose from the radiator.
9. Remove in the order indicated in the table.
10. Install in the reverse order of the removal.
11. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
12. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)
13. Inspect the ATF level. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)

**Simulation Function Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “PCM”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “PCM”.
     3. Select “DataLogger”.
3. Select the simulation items from the PID table.
4. Perform the simulation function, inspect the operations for each parts.
   - If there is no operation sound from the relay, motor, and solenoid after the simulation function inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.



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**DIAGNOSTIC MONITORING TEST RESULTS[L3 WITH TC]**

id010239801400

- The purpose of this test mode is to confirm the result of the OBD-II monitor diagnostic test results. The result values stored when a particular monitor is completed are displayed. If the monitor is not completed, the initial value is displayed.

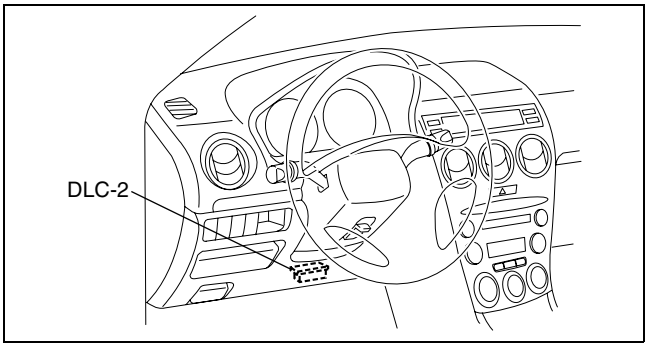
| TEST ID | Description | Related system |
|---|---|---|
| 10: 01: 80 | HO2S (Front) lean-to-rich response time (calculated) | HO2S |
| 10: 02: 03 | Low HO2S (Rear) voltage for switch time calculation (constant) | |
| 10: 02: 04 | High HO2S (Rear) voltage for switch time calculation (constant) | |
| 10: 02: 05 | HO2S (Rear) rich-to-lean response time (calculated) | |
| 10: 21: 80 | Front and HO2S (Rear) switching time ratio | Catalyst |
| 10: 31: 83 | EGR pressure variation | EGR |
| 10: 3A: 80 | EVAP system leak detection pump gross leak check | EVAP |
| 10: 3B: 80 | EVAP system leak detection pump small leak check | |
| 10: 3C: 80[*1] | EVAP system leak detection pump very small leak check | |
| 10: 3D: 80 | Purge flow monitor | |
| 10: A2: 0B | EWMA misfire counts for last 10 driving cycles | Misfire |
| 10: A2: 0C | Misfire counts for last/current driving cycles | |
| 10: A3: 0B | EWMA misfire counts for last 10 driving cycles | |
| 10: A3: 0C | Misfire counts for last/current driving cycles | |
| 10: A4: 0B | EWMA misfire counts for last 10 driving cycles | |
| 10: A4: 0C | Misfire counts for last/current driving cycles | |
| 10: A5: 0B | EWMA misfire counts for last 10 driving cycles | |
| 10: A5: 0C | Misfire counts for last/current driving cycles | |
| 10: E1: 80 | Heat radiation ratio | Engine cooling system |
| 10: E1: 81 | Misfire counts for last/current driving cycles | |

[*1] : California emission regulation applicable model

## AFTER REPAIR PROCEDURE[L3 WITH TC]

id010239801100

1. Connect the M-MDS to the DLC-2.
2. Cycle the ignition switch from the off to the ON position.
3. Any retrieved DTCs.
4. Clear all diagnostic data using the M-MDS.

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## KOEO/KOER SELF TEST[L3 WITH TC]

id010239801200

**Note**
- Perform a KOER self test with the engine idling after the engine speed increases to 2,000 rpm.

1. Perform the necessary vehicle preparation and visual inspection.
2. Connect the M-MDS to the vehicle DLC-2 16-pin connector located in the driver compartment.
3. Retrieve the KOEO/KOER DTCs using the M-MDS.

## OBD-II DRIVE MODE[L3 WITH TC]

id010239801300

- Using the OBD-II drive mode, the monitoring item requested by OBD-II regulations can be easily diagnosed.
- Performing the Drive Mode inspects the OBD-II system for proper operation and must be performed to ensure that no additional DTCs are present.
- The OBD-II drive mode is divided into the specific drive mode and single drive mode.
- For the specific drive mode, specified drive modes have been set for each individual monitoring item requested by OBD-II regulations, and they can be diagnosed individually. For the single drive mode, the entire monitoring item requested by OBD-II regulations can be diagnosed.
- The following modes are in the specific drive mode. The applicable system is diagnosed by driving in the following drive modes.
  - — PCM Adaptive Memory Produce Drive Mode
  - — EGR System Repair Verification Drive Mode
  - — HO2S heater, HO2S, and TWC Repair Verification Drive Mode
  - — EVAP System Repair Verification Drive Mode
- The following systems are diagnosed with the single drive mode.
  - — EGR system
  - — Oxygen sensor (HO2S)
  - — Oxygen sensor heater
  - — Catalytic converter (TWC)
  - — Fuel, misfire and evaporative (EVAP) system

**Caution**
- **While performing the Drive Mode, always operate the vehicle in a safe and lawful manner.**
- **When the M-MDS is used to observe monitor system status while driving, be sure to have another technician with you, or record the data in the M-MDS using the PID/DATA MONITOR AND RECORD function and inspect later.**

**Note**
- Vehicle speed and engine speed detected by the PCM may differ from that indicated by the speedometer and tachometer. Use the M-MDS to monitor vehicle speed.
- If the OBD-II system inspection is not completed during the Drive Mode, the following causes are considered:
  - — The OBD-II system detects the malfunction.
  - — The Drive Mode procedure is not completed correctly.
- Disconnecting the battery will reset the memory. Do not disconnect the battery during and after Drive Mode.
- The M-MDS can be used at anytime through the course of the Drive Mode to monitor the completion status. Monitoring can be done by viewing the ON BOARD SYSTEM READINESS menu.
- The OBD monitoring status can be confirmed with the ignition switch operation. During KOEO, the MIL illuminates for a fail-light inspection for **approx. 17 s**. The OBD monitoring status is confirmed after the fail-light inspection.
  - — If all of the diagnosis is completed even one time, the MIL will continue to illuminate.
  - — If all of the diagnosis is not completed, the MIL flashes for **approx. 7 s**, and then it illuminates until the engine is started.

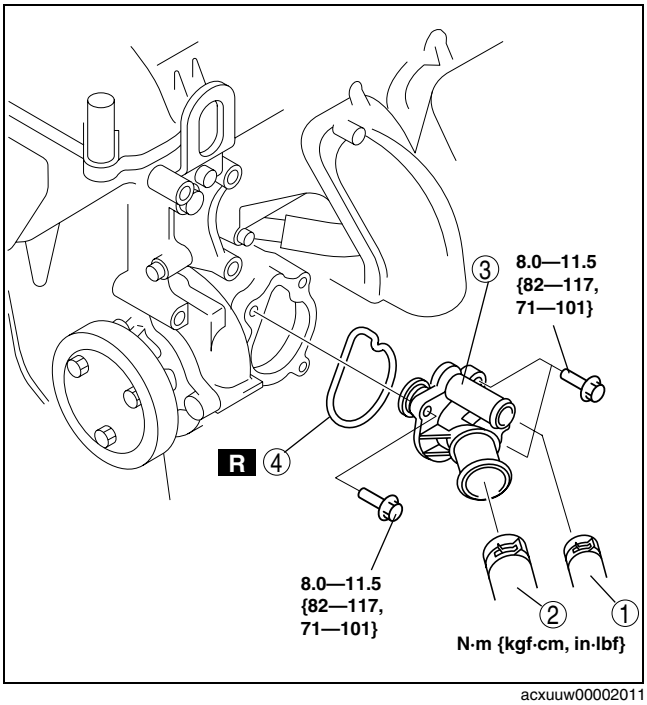
## THERMOSTAT REMOVAL/INSTALLATION[L3 WITH TC]

id011239801200

**Warning**
- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
3. Remove the front splash shield (RH).
4. Remove the charge air cooler duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the P/S oil pump with hose and pipe still connected. Position the P/S oil pump out of the way. (See 06-14-21 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
10. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].).

| | |
|---|---|
| 1 | Water hose |
| 2 | Lower radiator hose |
| 3 | Thermostat component |
| 4 | Gasket |

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## THERMOSTAT INSPECTION[L3 WITH TC]

id011239801300

1. Inspect the thermostat for the following.

**Warning**
- **During inspection, the thermostat and water are extremely hot and can cause severe burns. Do not touch the thermostat and water.**

- The valve should not open under normal temperature.
- Opening temperature and valve lift
  — If there is a malfunction, replace the thermostat.

**Thermostat initial-opening temperature**
**80— 84 °C {176— 183 °F}**

**Thermostat full-open temperature**
**97 °C {207 °F}**

**Thermostat full-open lift**
**More than 8.0 mm {0.31 in}**

## WATER PUMP REMOVAL/INSTALLATION[L3 WITH TC]

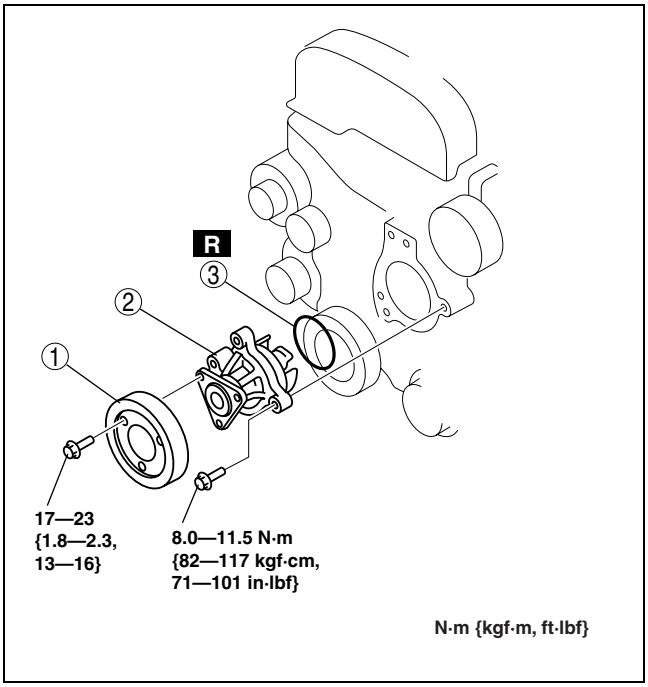
id011239800700

**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Disconnect the negative battery cable.
2. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
3. Remove the front splash shield (RH).
4. Remove the charge air cooler duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Loosen the water pump pulley bolts before removing the drive belt.
6. Remove the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
10. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].).

| | |
|---|---|
| 1 | Water pump pulley |
| 2 | Water pump |
| 3 | O-ring<br>(See 01-12-12 O-ring Installation Note.) |

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**O-ring Installation Note**

1. Apply engine coolant to a new O-ring.
2. Install the O-ring.

## FAN MOTOR REMOVAL/INSTALLATION[L3 WITH TC]

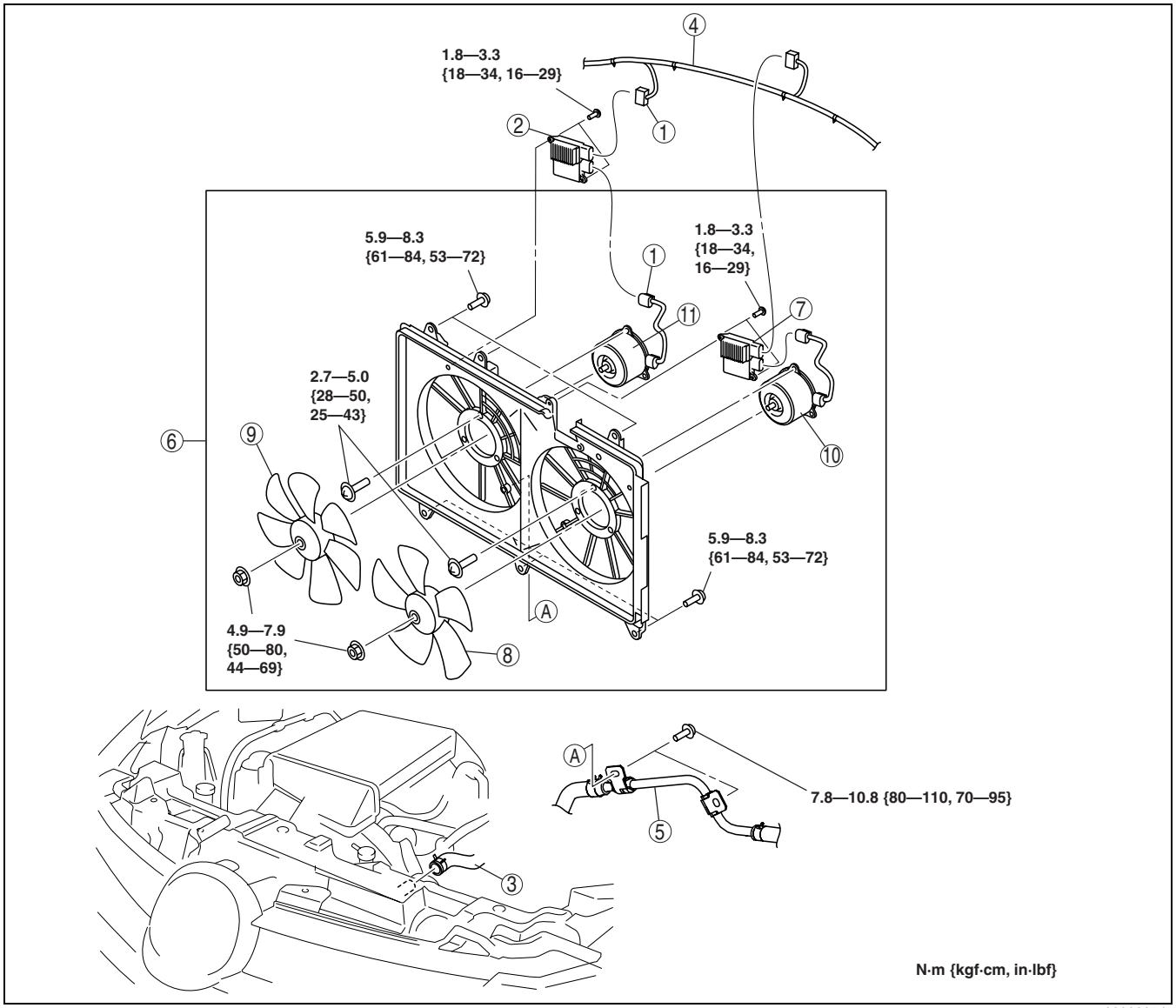
id011239801600

**Warning**

- **Never remove the cooling system cap or loosen the radiator drain plug while the engine is running, or when the engine and radiator are hot. Scalding engine coolant and steam may shoot out and cause serious injury. It may also damage the engine and cooling system.**
- **Turn off the engine and wait until it is cool. Even then, be very careful when removing the cap. Wrap a thick cloth around it and slowly turn it counterclockwise to the first stop. Step back while the pressure escapes.**
- **When you are sure all the pressure is gone, press down on the cap using the cloth, turn it, and remove it.**

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
4. Remove the charge air cooler duct, air cleaner and fresh air duct component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove the coolant reserve tank. (See 01-12-7 COOLANT RESERVE TANK REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the dipstick pipe. (See 01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Refill the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
10. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)



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| | |
|---|---|
| 1 | Fan control module connectors |
| 2 | Fan control module No.2 |
| 3 | Upper radiator hose |
| 4 | Wiring harness |
| 5 | ATF oil cooler pipe<br>(See 01-12-14 ATF Oil Cooler Pipe Removal Note.) |

| | |
|---|---|
| 6 | Cooling fan component<br>(See 01-12-14 Cooling Fan Component Removal Note.) |
| 7 | Fan control module No.1 |
| 8 | Cooling fan No.1 |
| 9 | Cooling fan No.2 |
| 10 | Cooling fan motor No.1 |
| 11 | Cooling fan motor No.2 |

**ATF Oil Cooler Pipe Removal Note**

1. Remove the ATF oil cooler pipe with the hoses still connected. Position the ATF oil cooler pipe so that it is out of the way.

**Cooling Fan Component Removal Note**

1. Remove the cooling fan component from above the engine compartment.

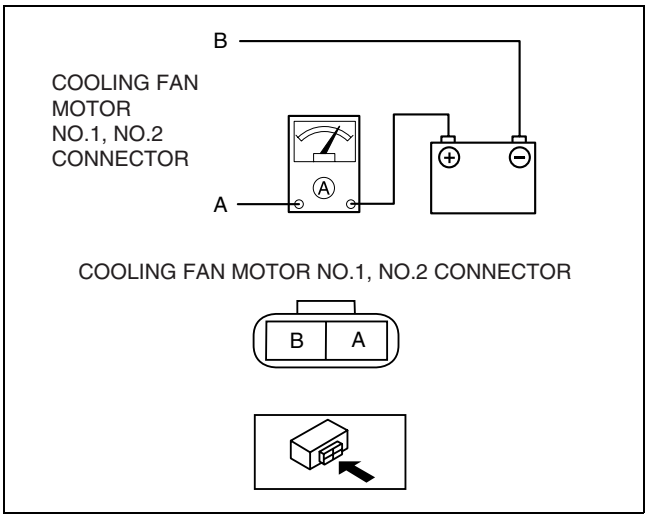
**FAN MOTOR INSPECTION[L3 WITH TC]**

id011239800900

**Part Inspection**

1. Verify that the battery is fully charged. (See 01-17-2 BATTERY INSPECTION[L3 WITH TC].)
2. Remove the charge air cooler duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Disconnect the cooling fan motor connector (2 terminals).
4. Install a tester and battery to the cooling fan motor connector (2 terminals) as shown in the figure.
5. Verify that each fan motors operate smoothly at the standard current.
   - If there is any malfunction, replace the applicable part.

   **Cooling fan motor No.1, No.2 standard current**
   **17.5— 22.5 A**

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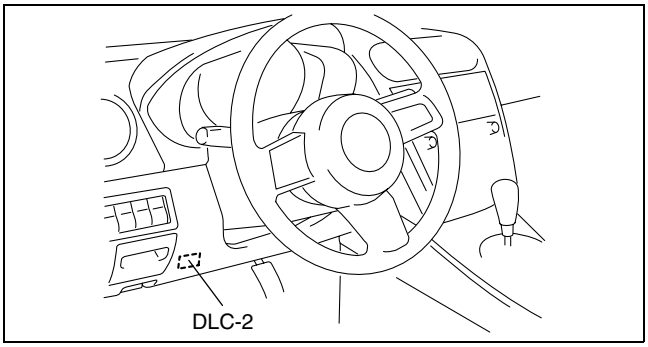
**FAN CONTROL MODULE INSPECTION[L3 WITH TC]**

id011239801100

1. Remove the charge air cooler duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Connect the M-MDS to the DLC-2.
3. Start and warm up the engine.
4. Monitor the engine coolant temperature with the M-MDS.

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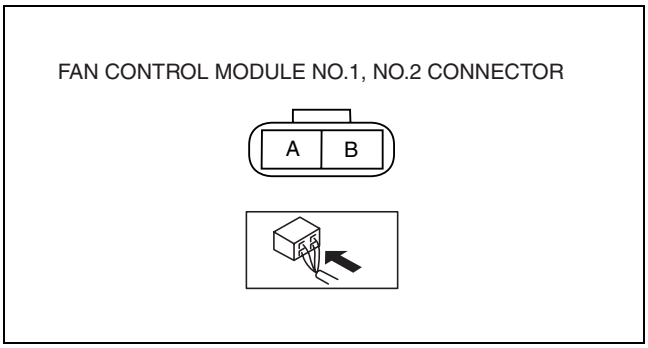
5. Measure the voltage at terminal A of the fan control module connector (2 terminals) as shown in the table.
   - If not within the specification, inspect the input signals from the following parts.
     — Crankshaft Position (CKP) sensor
     — Engine Coolant Temperature (ECT) sensor
     — Throttle Position (TP) sensor
     — Refrigerant pressure switch (middle)

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**Fan control module No.1**

| Inspection | | | Result |
|---|---|---|---|
| Condition | A/C | Engine coolant temp. | |
| IG SW ON | OFF | 95 °C {203 °F} or less | 0 V (Fan stops.) |
| IG SW ON (Idling) | OFF | 95 °C {203 °F} or less | 0 V (Fan stops.) |
| IG SW ON (Idling) | ON*1 | 95 °C {203 °F} or less | 4.1 V |
| IG SW ON (Idling) | ON*2 | 95 °C {203 °F} or less | 6.2 V |
| IG SW ON (Idling) | OFF | 100 °C {212 °F} or more | 4.1— 14.6 V |

**Fan control module No.2**

| Inspection | | | Result |
|---|---|---|---|
| Condition | A/C | Engine coolant temp. | |
| IG SW ON | OFF | 95 °C {203 °F} or less | 0 V (Fan stops.) |
| IG SW ON (Idling) | OFF | 95 °C {203 °F} or less | 0 V (Fan stops.) |
| IG SW ON (Idling) | ON*1 | 95 °C {203 °F} or less | 5.5 V |
| IG SW ON (Idling) | ON*2 | 95 °C {203 °F} or less | 10.3 V |
| IG SW ON (Idling) | OFF | 100 °C {212 °F} or more | 4.1— 14.6 V |

*1 : Refrigerant pressure switch (middle) is off.
*2 : Refrigerant pressure switch (middle) is on.

6. If all the above parts are normal, replace the fan control module.

# 01-13 INTAKE-AIR SYSTEM [L3 WITH TC]


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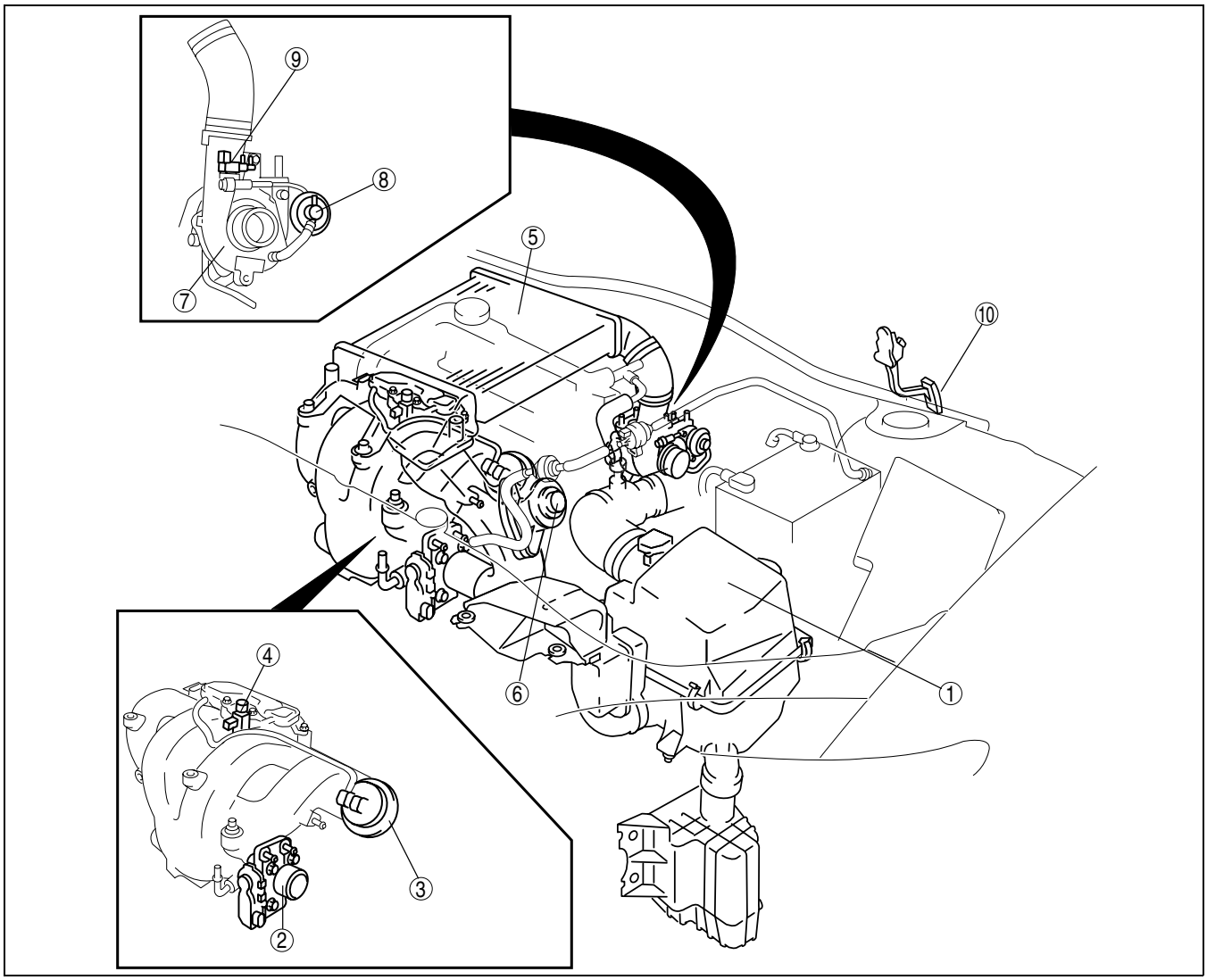


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| | |
|---|---|
| 1 | Air cleaner<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-11 AIR CLEANER ELEMENT INSPECTION[L3 WITH TC].) |
| 2 | Throttle body<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-12 THROTTLE ACTUATOR INSPECTION[L3 WITH TC].) |
| 3 | Variable swirl shutter valve actuator<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-13 VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION[L3 WITH TC].) |
| 4 | Variable swirl solenoid valve<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-13 VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC].) |
| 5 | Charge air cooler<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-11 CHARGE AIR COOLER INSPECTION[L3 WITH TC].) |

| | |
|---|---|
| 6 | Air bypass valve<br>(See01-13-11 AIR BYPASS VALVE INSPECTION[L3 WITH TC].) |
| 7 | Turbocharger<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-17 TURBOCHARGER INSPECTION[L3 WITH TC].) |
| 8 | Wastegate actuator<br>(See01-13-16 WASTEGATE ACTUATOR INSPECTION[L3 WITH TC].) |
| 9 | Wastegate control solenoid valve<br>(See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-13-14 WASTEGATE CONTROL SOLENOID VALVE INSPECTION[L3 WITH TC].) |
| 10 | Accelerator pedal<br>(See01-13-17 ACCELERATOR PEDAL REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].) |

## INTAKE AIR SYSTEM FLOW DIAGRAM[L3 WITH TC]

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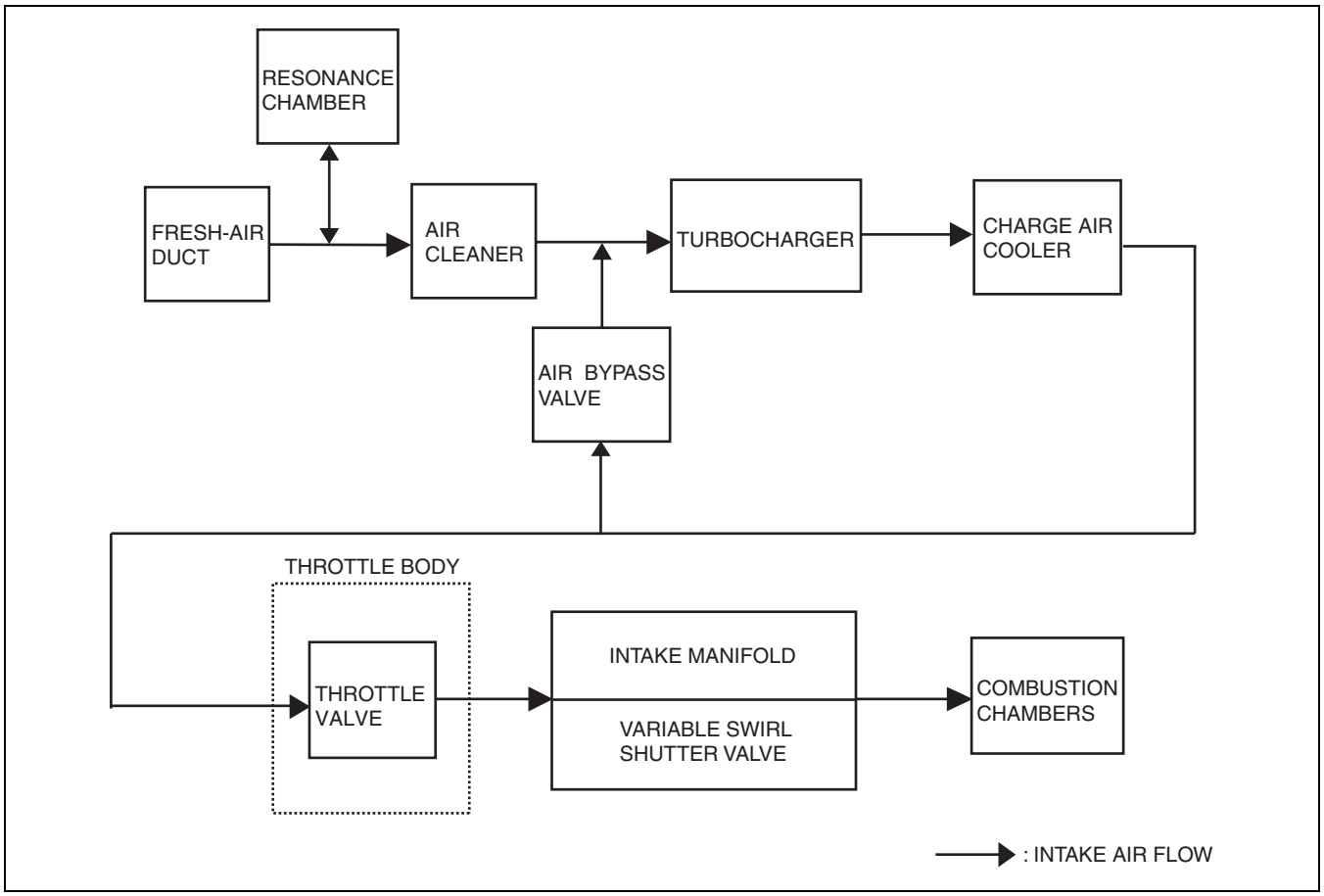


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## VACUUM HOSE ROUTING DIAGRAM[L3 WITH TC]

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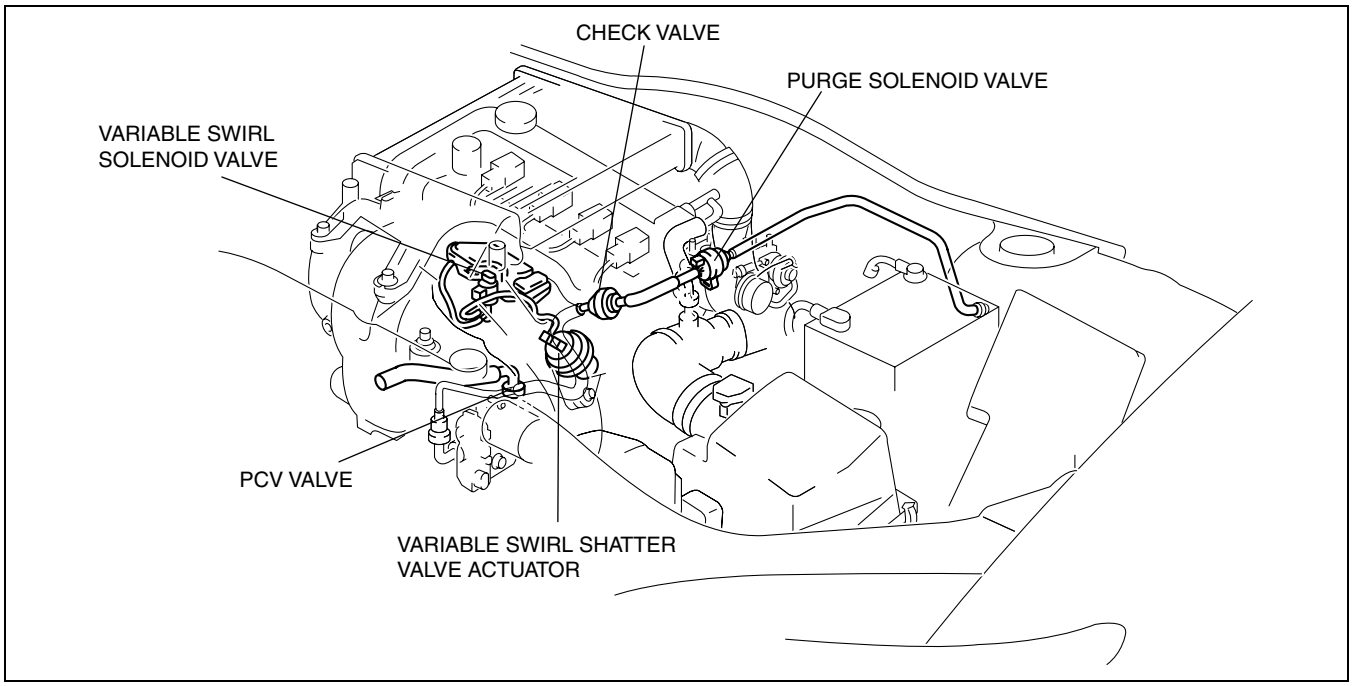


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## INTAKE AIR SYSTEM MANIFOLD VACUUM INSPECTION[L3 WITH TC]

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1. Verify that the intake air hoses are installed securely.
2. Warm up the engine.
3. Disconnect the vacuum hose connected between the check valve and the intake manifold from the intake manifold and install the vacuum gauge. (See 01-14-19 QUICK RELEASE CONNECTOR REMOVAL/ INSTALLATION[L3 WITH TC])
4. Measure the intake manifold vacuum while idling (no load) using the vacuum gauge.
   - If not within the specification, perform the following inspections.
     — Accelerator cable play
     — Compression pressure (See 01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)
     — Air suction (installation areas of throttle body, fuel injector, PCV valve, intake manifold)

**Note**
- If any air suction exists, the change in engine speed can be made apparent by spraying the penetrant lubricating spray on the applicable part.

**Standard**
**–71 kPa {–533 mmHg, –21 inHg} or more**

## INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC]

id011339800400

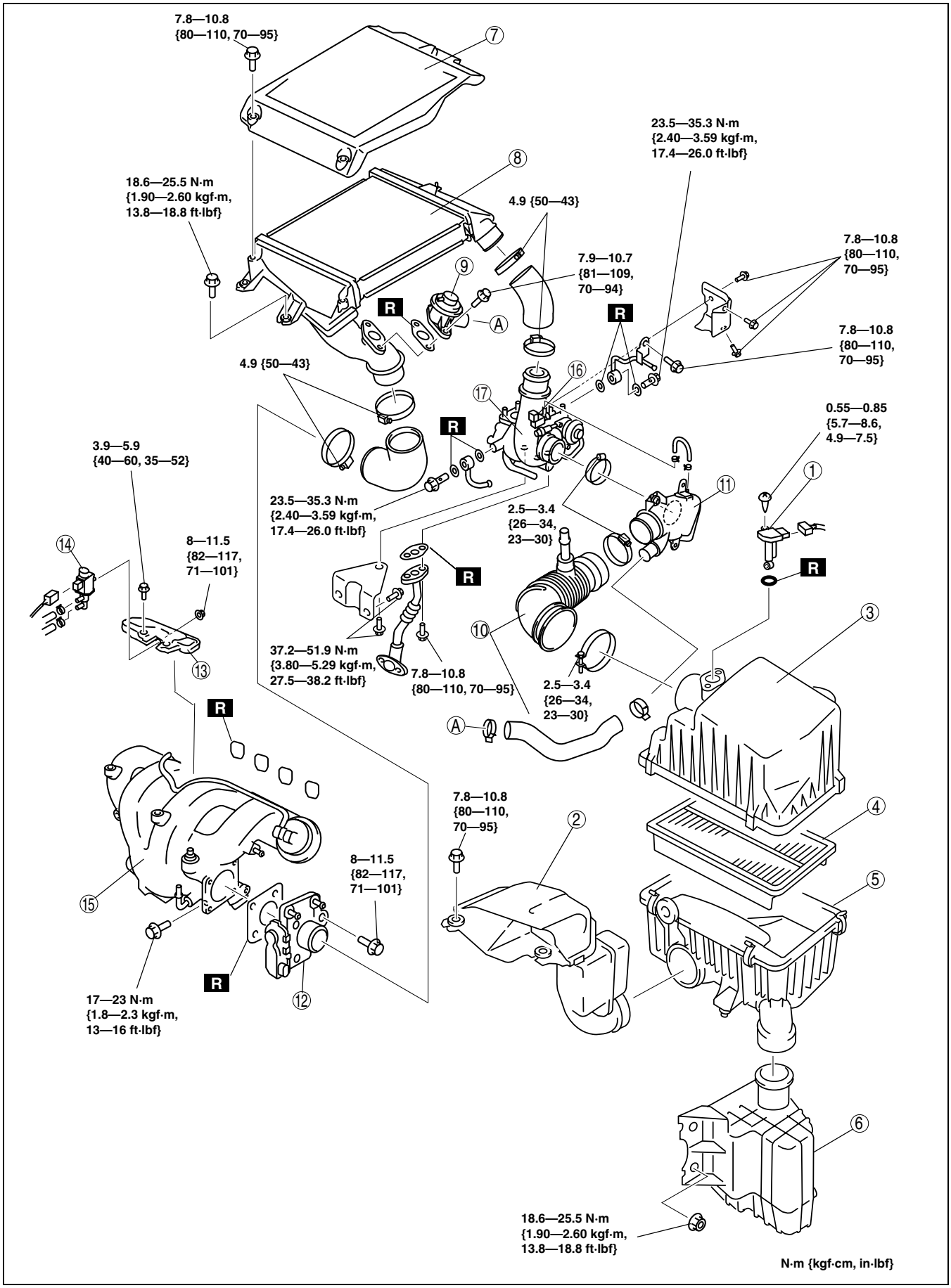


**Warning**

- **A hot engine and intake air system can cause severe burns. Turn off the engine and wait until they are cool before removing the intake air system.**
- **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure". (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct.
3. Remove the battery and battery tray. (See01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the under cover.
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

7. Complete the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

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| | |
|---|---|
| 1 | MAF/IAT sensor |
| 2 | Fresh air duct |
| 3 | Air cleaner cover |
| 4 | Air cleaner element |
| 5 | Air cleaner case |
| 6 | Resonance chamber<br>(See01-13-7 Air Hose Removal Note.) |
| 7 | Charge air cooler cover |
| 8 | Charge air cooler |
| 9 | Air bypass valve |
| 10 | Air hose<br>(See01-13-7 Air Hose Removal Note.) |
| 11 | Air duct (See 01-13-7 Air Duct Removal Note) |

| | |
|---|---|
| 12 | Throttle body<br>(See01-13-7 Throttle Body Removal Note.)<br>(See01-13-10 Throttle Body Installation Note.) |
| 13 | Vacuum chamber |
| 14 | Variable swirl solenoid valve |
| 15 | Intake manifold<br>(See01-13-7 Intake Manifold Removal Note.) |
| 16 | Wastegate control solenoid valve<br>(See01-13-10 Wastegate Control Solenoid Valve Installation Note.) |
| 17 | Turbocharger<br>(See01-13-8 Turbocharger Removal Note.)<br>(See01-13-9 Turbocharger Installation Note.) |



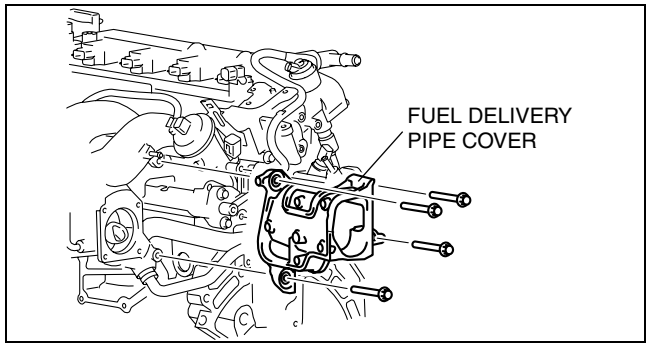
**Resonance Chamber Removal Note**
1. Remove the mudguard (LF).
2. Remove the resonance chamber.

**Air Hose Removal Note**
1. Disconnect the variable swirl shutter valve switch connector.
2. Disconnect the fuel injector harness connector.
3. Disconnect the ventilation hose connected to the air hose.
4. Remove the air hose.

**Air Duct Removal Note**
1. Disconnect the wastegate control solenoid valve connector.
2. Disconnect the purge solenoid valve connector.
3. Disconnect the EGR valve connector.
4. ATF gage pipe out of the way.
5. Remove the air duct.

**Throttle Body Removal Note**
1. Disconnect the throttle body connector.
2. Drain the engine coolant before removing the water hose. (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
3. Remove the throttle body.

**Intake Manifold Removal Note**
1. Remove the fuel delivery pipe cover.
2. Disconnect the quick connector connected to the intake manifold.
3. Remove the EGR pipe.
4. Disconnect the variable swirl solenoid valve connector.
5. Disconnect the OCV connector.
6. Disconnect the PSP switch connector.
7. Remove the oil level gauge pipe. (See01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].)
8. Remove the splash shield (RF).
9. Remove the drive belt. (See01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
10. Set the power steering oil pump out of the way.
11. Disconnect the fuel pressure sensor connector.
12. Disconnect the vacuum hose connected between the intake manifold and the master cylinder from the intake manifold.
13. Disconnect the MAP sensor connector.
14. Remove the intake manifold installation bolts.
15. Disconnect the evaporative hose connected between the intake manifold and the PCV valve from the intake manifold.
16. Remove the intake manifold.



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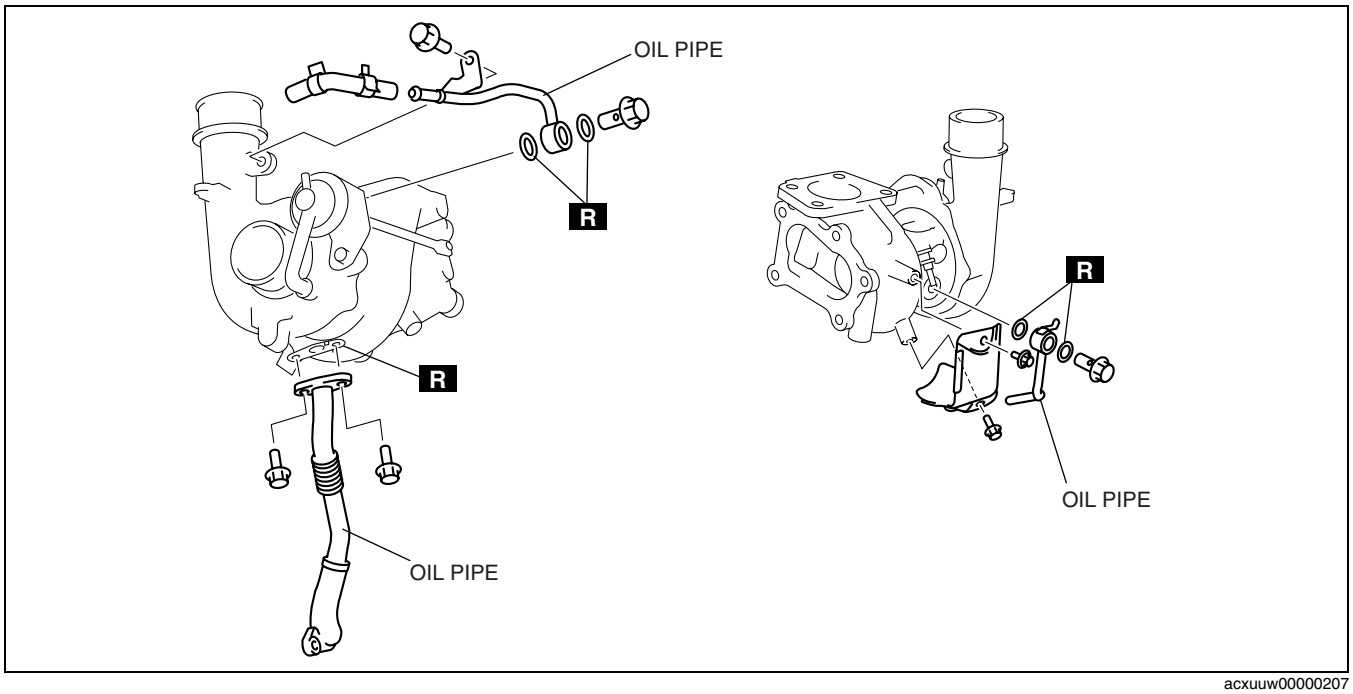
**Turbocharger Removal Note**

1. Remove the middle pipe (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Disconnect the rear HO2S connector.
3. Remove the front pipe. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

**Caution**

- **When removing the cowl grille, a part or tool may hit the edge of the windshield and could damage it. Protect the windshield by covering it with a clean rag to prevent damage to the windshield.**

4. Remove the cowl grille. (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
5. Remove the windshield wiper motor.
6. Remove the cowl panel.
7. Remove the insulator (Exhaust manifold upper side). (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
8. Set the generator out of the way. (See01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC].)
9. Remove the insulator (Exhaust manifold lower side). (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
10. Disconnect the front HO2S connector.
11. Remove the insulator (WU-TWC top side). (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
12. Remove the vacuum hose (Brake master back side).
13. Remove the front HO2S. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
14. Remove the WU-TWC. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
15. Remove the oil pipes.

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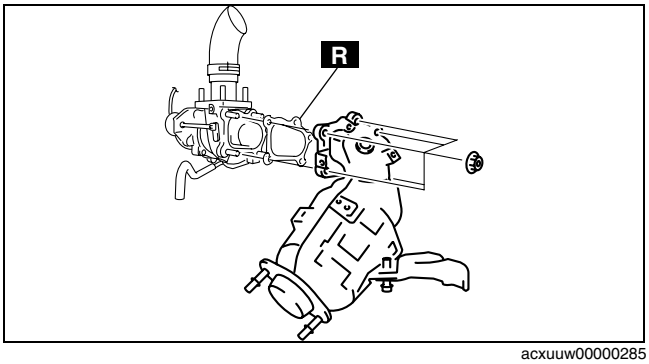
16. Remove the turbocharger.

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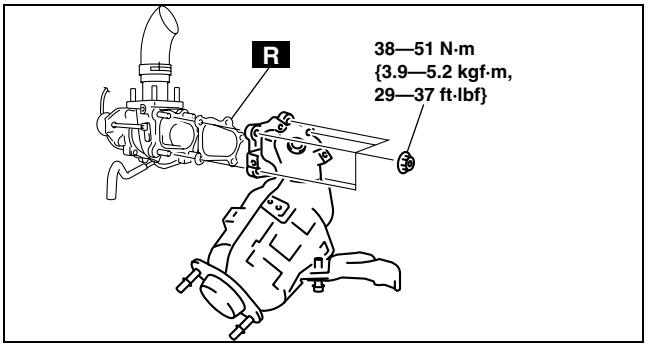
**Turbocharger Installation Note**

1. Install the turbocharger.

   **Tightening torque**
   **38— 51 N·m {3.9— 5.2 kgf·m, 29— 37 ft·lbf}**

2. Install the WU-TWC. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Install the front HO2S. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

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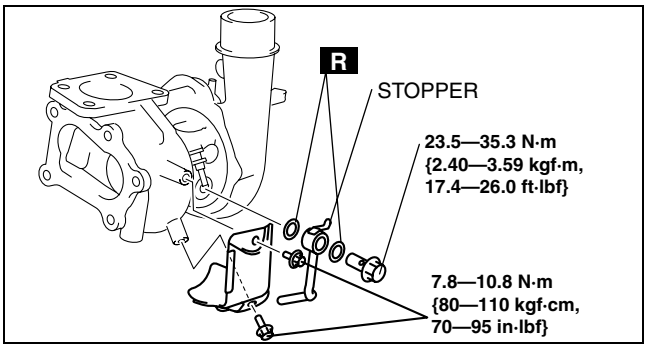
4. Tight the oil pipe installation bolt while the stopper of the oil pipe is faced to the turbocharger.

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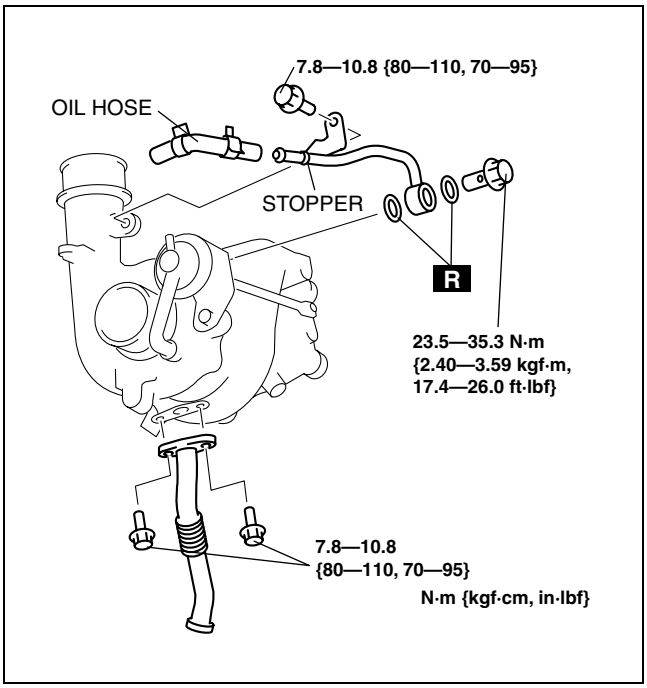
5. Install the oil pipes and, insert the oil hose until it reaches the stopper.

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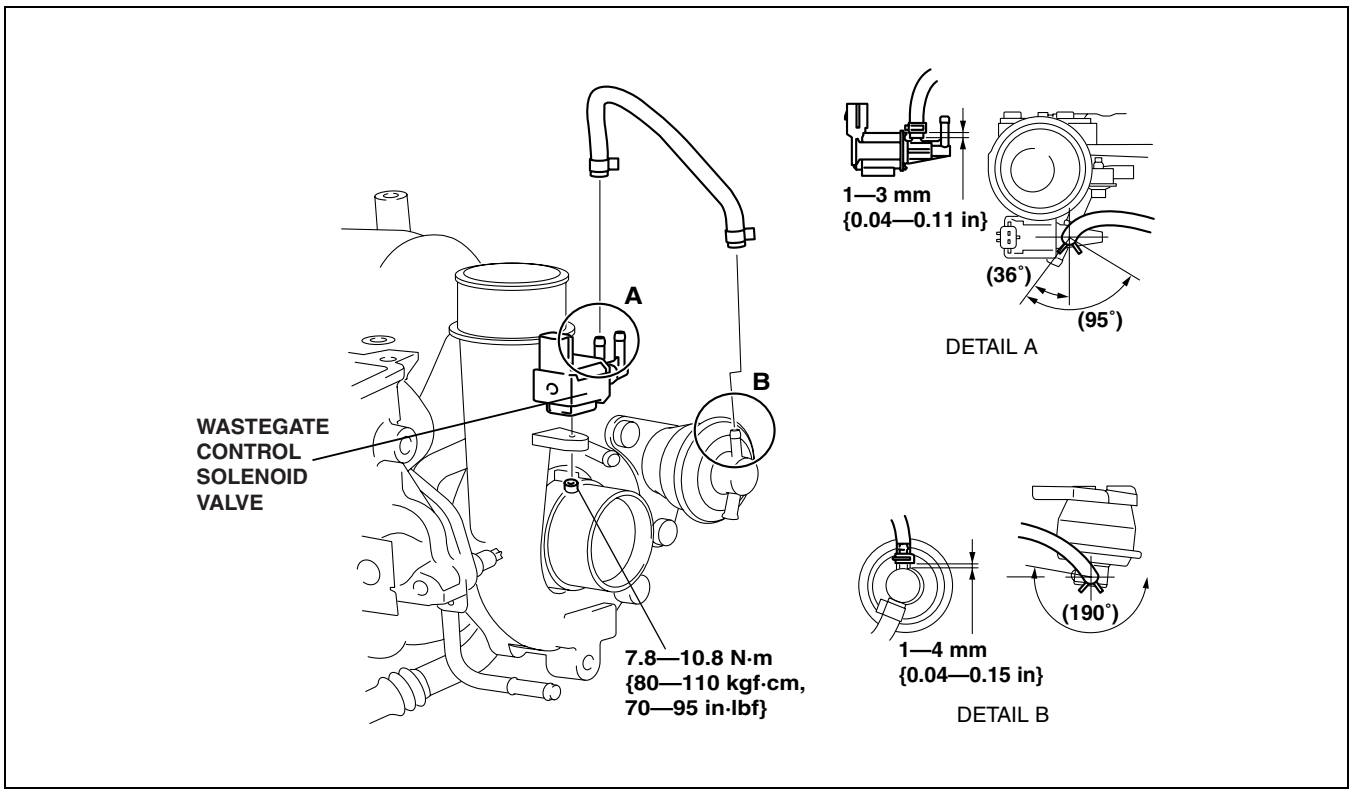
**Wastegate Control Solenoid Valve Installation Note**

1. Install the wastegate control solenoid valve.

**Tightening torque**
**7.8— 10.8 N·m {80— 110 kgf·cm, 70— 95 in·lbf}**

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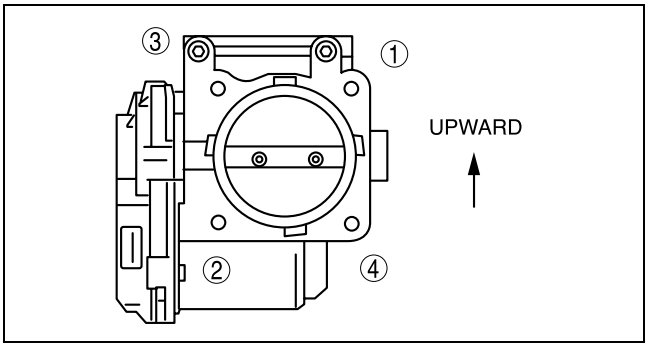
2. Install the hose as shown in the figure.

**Throttle Body Installation Note**

1. Tighten the throttle body installation bolts in the order shown in the figure.

**Tightening torque**
**8— 11.5 N·m {82— 117 kgf·cm, 71— 101 in·lbf}**

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**Air Cleaner Case Installation Note**

**Caution**
- **Before assembling the air cleaner, verify that the rubber mounts have not fallen off from the air cleaner bracket (3 locations).**
- **Always install the air cleaner case using the following procedure.**

**Note**
- When inserting the rubber mounts into the air cleaner case, soapy water can be applied.

1. Verify that the rubber mounts are set in the air cleaner bracket (3 locations).
2. Install the projections on the frame side (2 locations).
3. Verify that the projections on the frame side are installed securely.
4. Install the projection on the engine side (remaining location).
5. Verify that the projection on the engine side installed securely.

### AIR CLEANER ELEMENT INSPECTION[L3 WITH TC]

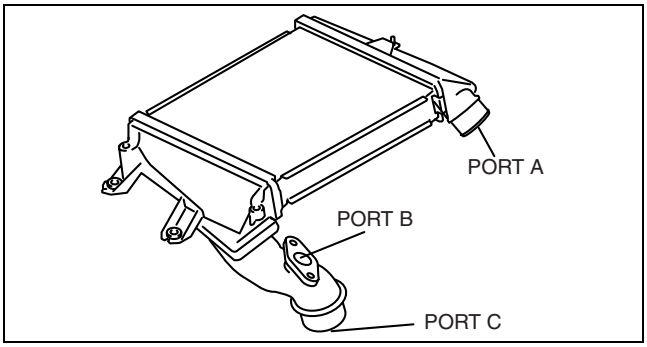
id011339800800

1. Remove the air cleaner element. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Verify that the air cleaner element surface is free of dirt.
   - If there is dirt, use an air gun or similar tool to clean the element.
   - If the replacement time limit has passed, replace the element.

### CHARGE AIR COOLER INSPECTION[L3 WITH TC]

id011339800900

1. Remove the charge air cooler duct.
2. Remove the charge air cooler cover. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the charge air cooler. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the air bypass valve. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Plug ports A and B.
6. Verify that there is no air leakage when air is sent from port C.
   - If there is leakage, replace the charge air cooler.

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### AIR BYPASS VALVE INSPECTION[L3 WITH TC]

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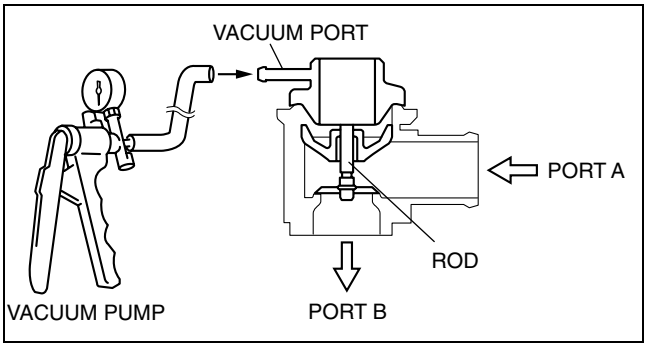
1. Remove the charge air cooler duct.
2. Remove the air bypass valve. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Connect the vacuum pump to the vacuum ports of the air bypass valve.

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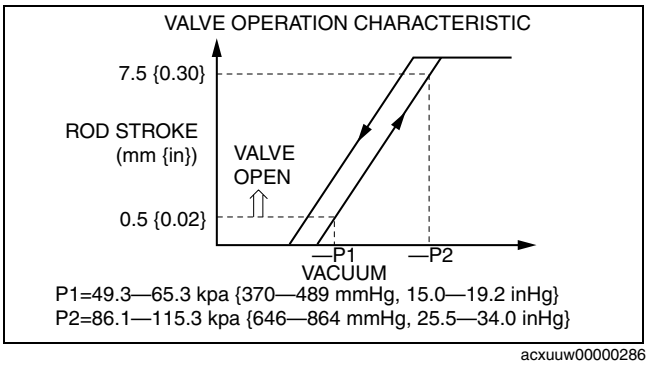
**Approx. value**

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4. Verify that the airflow is as indicated in the table.
   - If there is any malfunction, replace the air bypass valve.

| Vacuum (kPa {mmHg, inHg}) | Valve operation condition | Airflow between port A— B |
|---|---|---|
| –66 {–496, –20} or more | Open | Yes |
| –49 {–367, –14} or less | Closed | No |

### THROTTLE ACTUATOR INSPECTION[L3 WITH TC]

id011339801300

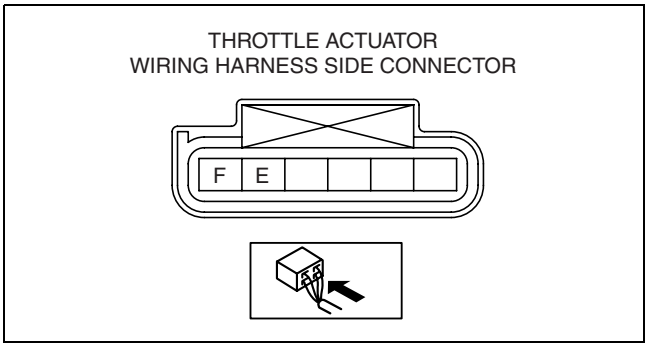
**Note**
- Perform the following inspection only when directed.

**Resistance Inspection**
1. Disconnect the negative battery cable.
2. Disconnect the throttle body connector.
3. Measure the resistance between the throttle actuator terminals using a tester.
   - If not as specified, replace the throttle body. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
   - If as specified, carry out the “Circuit Open/Short Inspection”.

**Specification**

| Ambient temperature (°C {°F}) | Resistance (ohm) |
|---|---|
| Approx. 20 {68} | 0.3— 100 |

**Circuit Open/Short Inspection**
1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit (continuity check).

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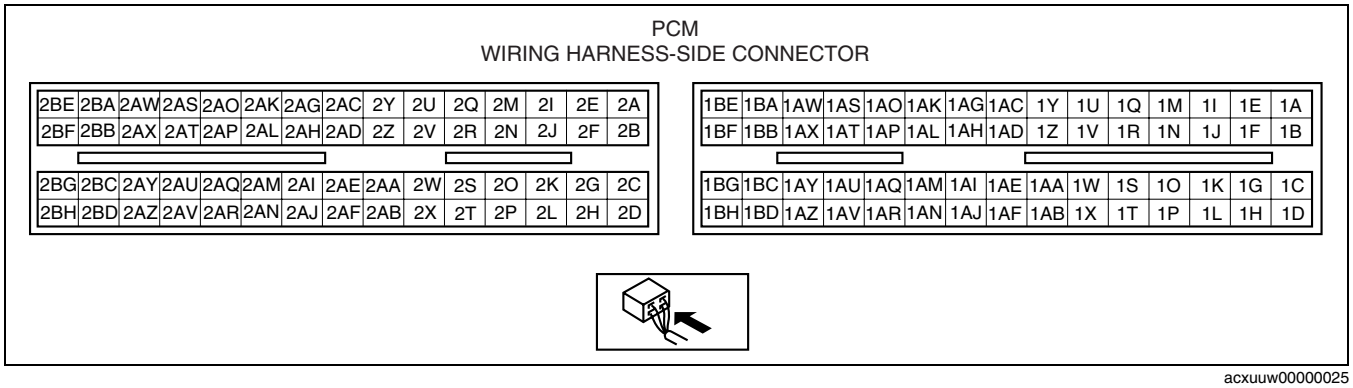


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**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  — Throttle actuator terminal F and PCM terminal 2A
  — Throttle actuator terminal E and PCM terminal 2B

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  — Throttle actuator terminal F and power supply
  — Throttle actuator terminal F and ground
  — Throttle actuator terminal E and power supply
  — Throttle actuator terminal E and ground

### VARIABLE SWIRL SHUTTER VALVE ACTUATOR INSPECTION[L3 WITH TC]

id011339801200

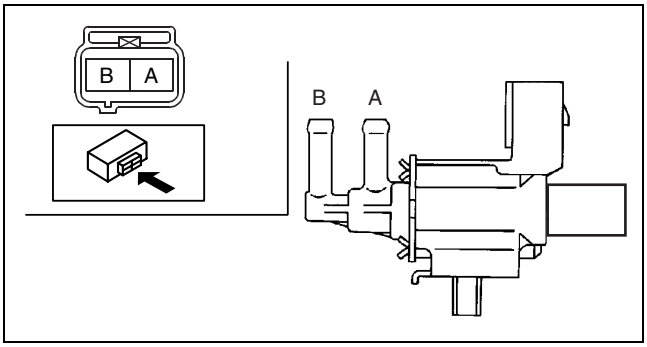
1. Remove the air hose. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Disconnect the vacuum hose from the variable swirl control solenoid valve.
3. Connect a vacuum pump to the variable swirl shutter valve actuator.
4. Apply vacuum and verify that the rod moves.
   - If the rod does not move, replace the intake manifold. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

| Vacuum kPa {mmHg, inHg} | Rod movement |
|---|---|
| –2.7 {–20, –0.7} or less | Not move |
| –33.4 {–251, –9.9} or more | Fully pulled |

### VARIABLE SWIRL SOLENOID VALVE INSPECTION[L3 WITH TC]

id011339801100

1. Remove the variable swirl solenoid valve.
2. Inspect the airflow between the ports under the following conditions.
   - If not as specified, replace the variable swirl control solenoid valve.
   - If as specified, carry out the “Circuit Open/Short Inspection”.

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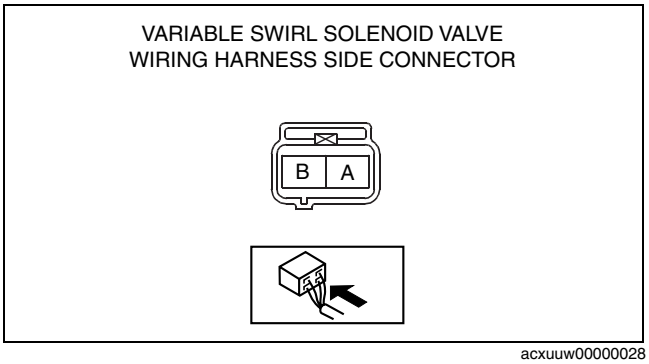
○—○ : Continuity ○═○ : Airflow

| Step | Terminal | | Port | |
|---|---|---|---|---|
| | A | B | A | B |
| 1 | ○—○ | | | |
| 2 | B+ | GND | ○═○ | |

acxuuw00000027

### Circuit Open/Short Inspection

1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harness for open or short circuit (continuity check).

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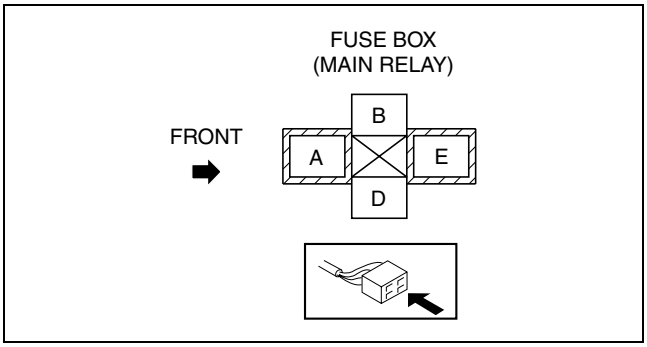


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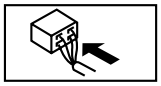
PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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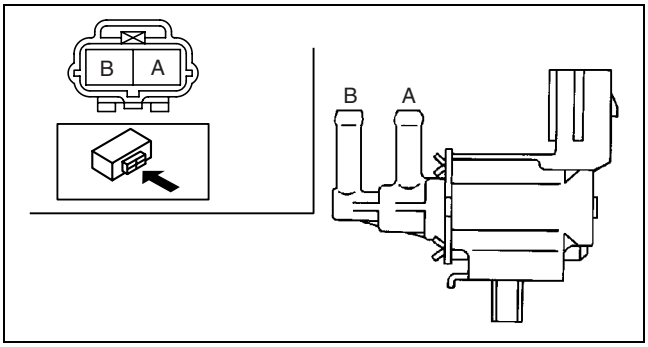
**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Variable swirl solenoid valve terminal B and PCM terminal 2AS
  - — Variable swirl solenoid valve terminal A and main relay terminal E

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Variable swirl solenoid valve terminal A and body ground
  - — Variable swirl solenoid valve terminal B and power supply
  - — Variable swirl solenoid valve terminal B and body ground

### WASTEGATE CONTROL SOLENOID VALVE INSPECTION[L3 WITH TC]

id011339800600

1. Remove the wastegate control solenoid valve. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
2. Inspect the airflow between the ports under the following conditions.
   - If not as specified, replace the wastegate control solenoid valve.
   - If as specified, carry out the “Circuit Open/ Short Inspection”.




acxuuw00000030

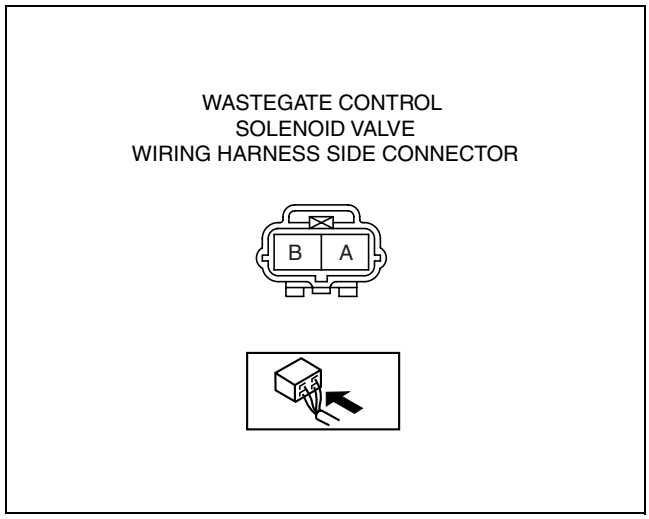
○—○ : Continuity ○═○ : Airflow

| Step | Terminal | | Port | |
|---|---|---|---|---|
| | A | B | A | B |
| 1 | ○—○ | | | |
| 2 | B+ | GND | ○═○ | |

acxuuw00000031

**Circuit Open/Short Inspection**

1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harness for an open or short circuit (continuity check).

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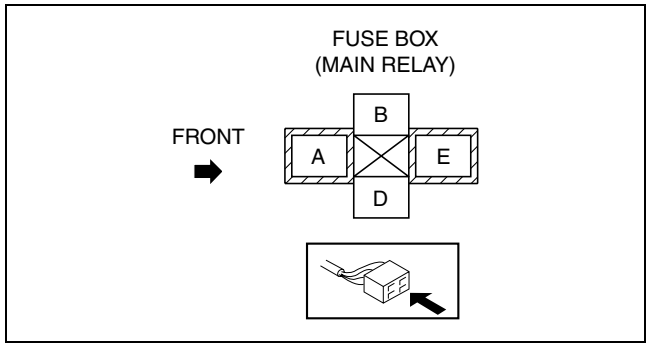


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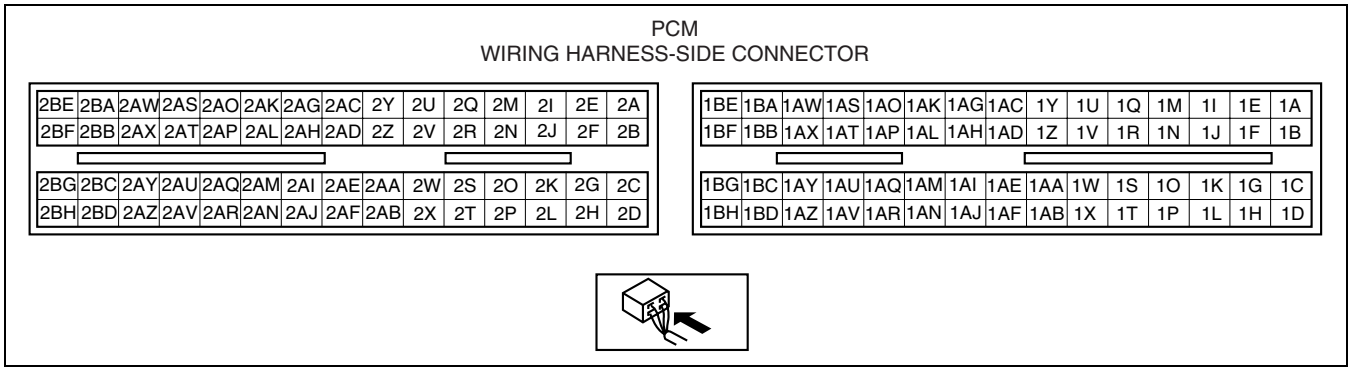


| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |

| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |

| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |

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**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Wastegate control solenoid valve terminal B and PCM terminal 2AA
  - — Wastegate control solenoid valve terminal A and main relay terminal E

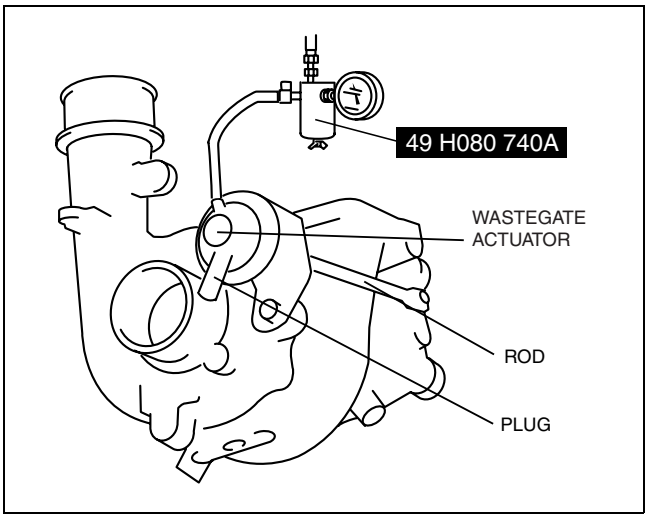
**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Wastegate control solenoid valve terminal A and body ground
  - — Wastegate control solenoid valve terminal B and power supply
  - — Wastegate control solenoid valve terminal B and body ground

## WASTEGATE ACTUATOR INSPECTION[L3 WITH TC]

id011339800700

1. Remove the air hose and air duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
2. Disconnect the hose from the wastegate actuator.
3. Plug the wastegate actuator as shown in the figure.
4. Connect the vacuum pump to the port

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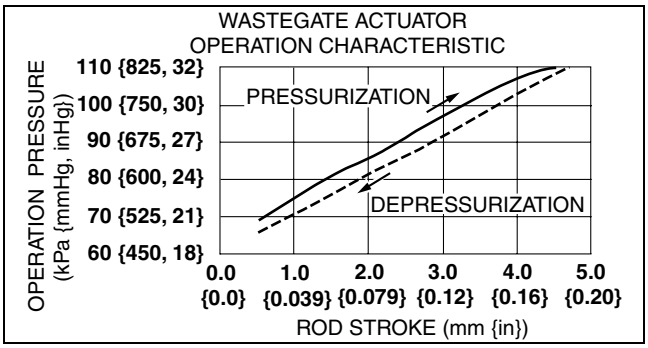
5. Raise the pressure slowly and take a measurement of the pressure when the rod stroke is 1.5 mm {0.06 in}.
   - If the rod does not move, replace the turbocharger.

   **Specification (rod stroke: 1.5 mm {0.06 in})**
   **78.0— 83.4 kPa {586— 625 mmHg, 23.1— 24.6 inHg}**

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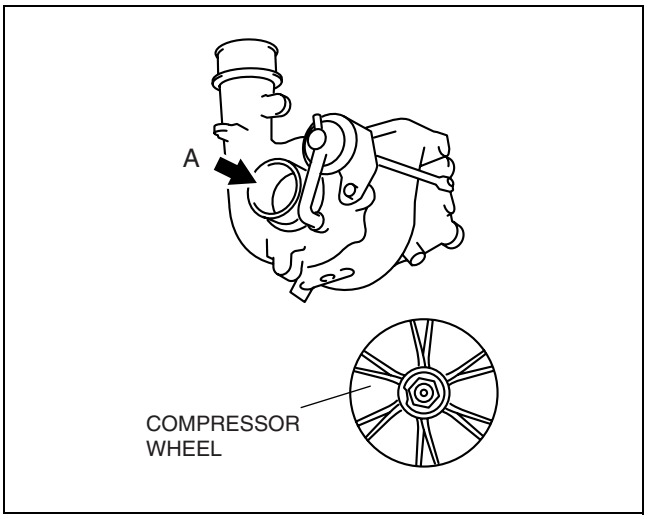
## TURBOCHARGER INSPECTION[L3 WITH TC]

id011339801000

### Compressor Wheel Inspection

1. Remove the turbocharger. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Visually inspect the compressor wheel from view A for the cracks, damage, or bending on all the compressor wheel blades.
   - If there are any cracks or damage, replace the turbocharger.

   **Note**
   - If there is contact between the compressor wheel and compressor housing, there may be cracks, damage, or bending on the blade end area.
   - If there are cracks, damage, or bending on the compressor wheel, verify the following after replacing the turbocharger.
     — Intake air/exhaust system related components
     — Oil pipe damage

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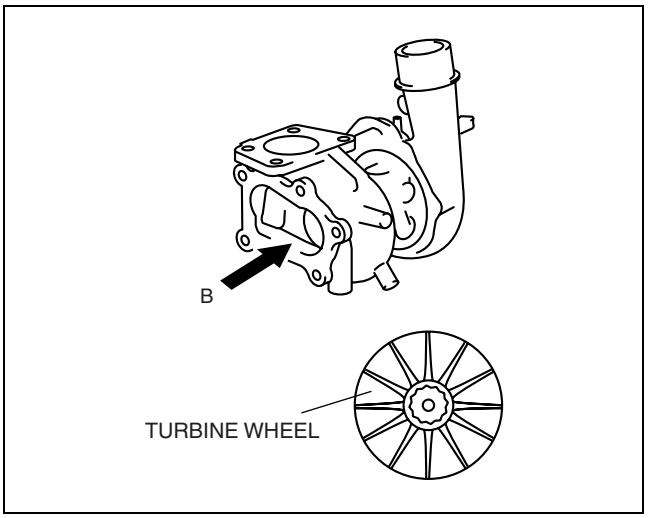
### Turbine wheel inspection

1. Remove the turbocharger. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Visually inspect the turbine wheel from view B for the cracks, damage, or bending on all the turbine wheel blades.
   - If there are cracks, damage, or bending on the turbine wheel, replace the turbocharger.

   **Note**
   - If there is contact between the turbine wheel and turbine housing, there may be cracks, damage, or bending on the blade end area.
   - If there are cracks, damage, or bending on the turbine wheel, verify the following after replacing the turbocharger.
     — Intake air/exhaust system related components
     — Oil pipe damage

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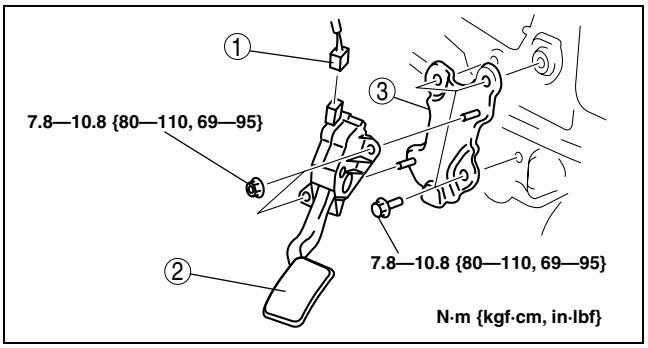
## ACCELERATOR PEDAL REMOVAL/INSTALLATION[L3 WITH TC]

id011339801400

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Accelerator pedal |

3. Install in the reverse order of removal.

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# 01-14 FUEL SYSTEM [L3 WITH TC]


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## FUEL SYSTEM LOCATION INDEX[L3 WITH TC]

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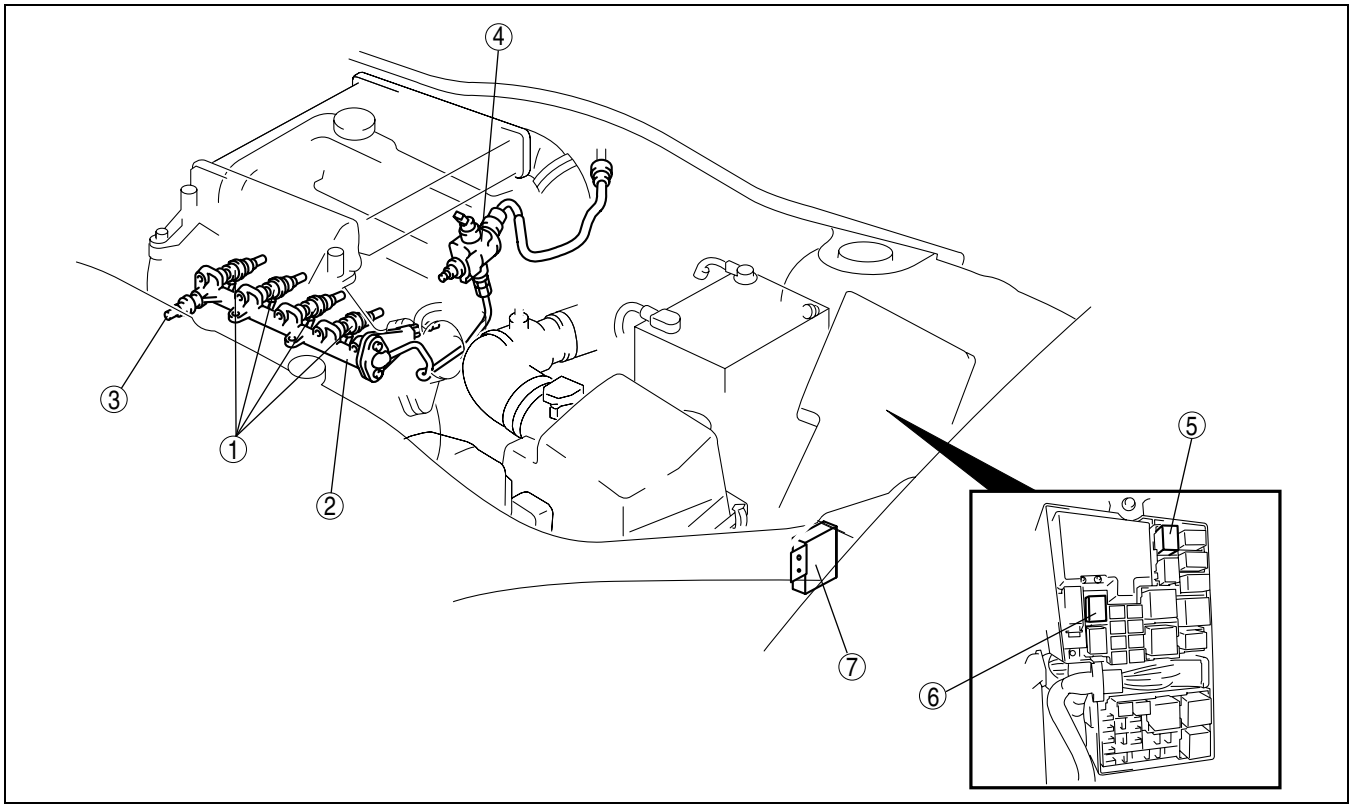
### Engine Room Side

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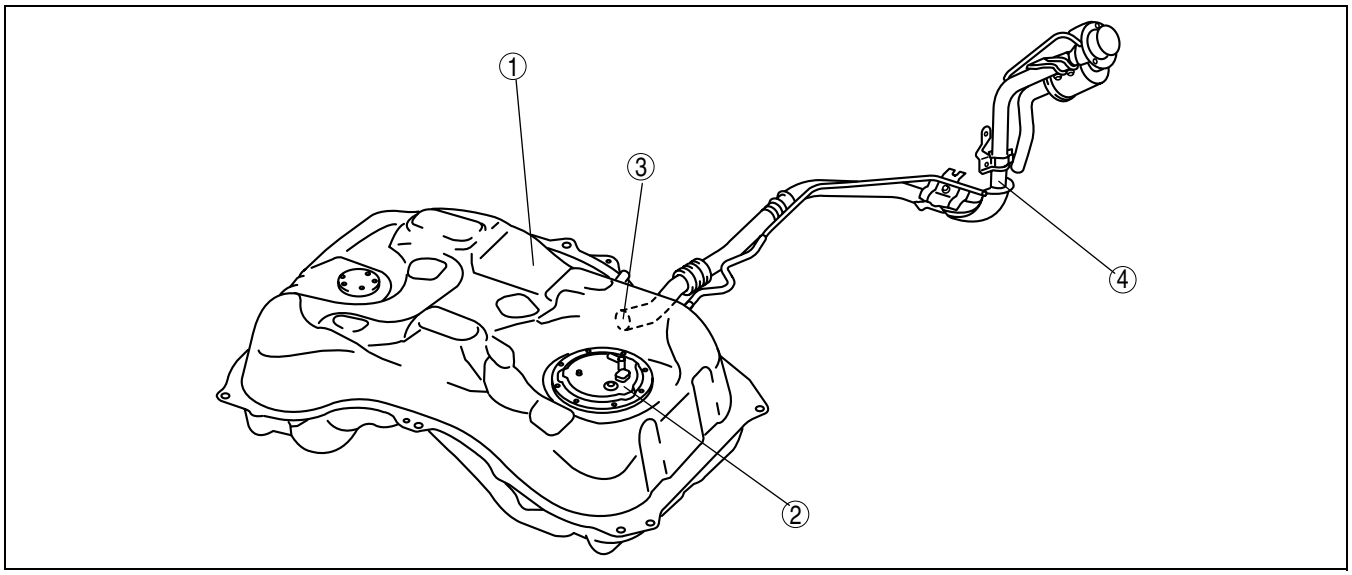
| | |
|---|---|
| 1 | Fuel injector<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-14-27 FUEL INJECTOR INSPECTION[L3 WITH TC].) |
| 2 | Fuel delivery pipe<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 3 | Fuel pressure sensor<br>(See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) |

| | |
|---|---|
| 4 | High pressure fuel pump<br>(See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-14-19 HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC].) |
| 5 | Fuel pump relay |
| 6 | Fuel pump speed control relay |
| 7 | Fuel pump resistor<br>(See01-14-15 FUEL PUMP RESISTOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-14-16 FUEL PUMP RESISTOR INSPECTION[L3 WITH TC].) |

**Fuel Tank Side**

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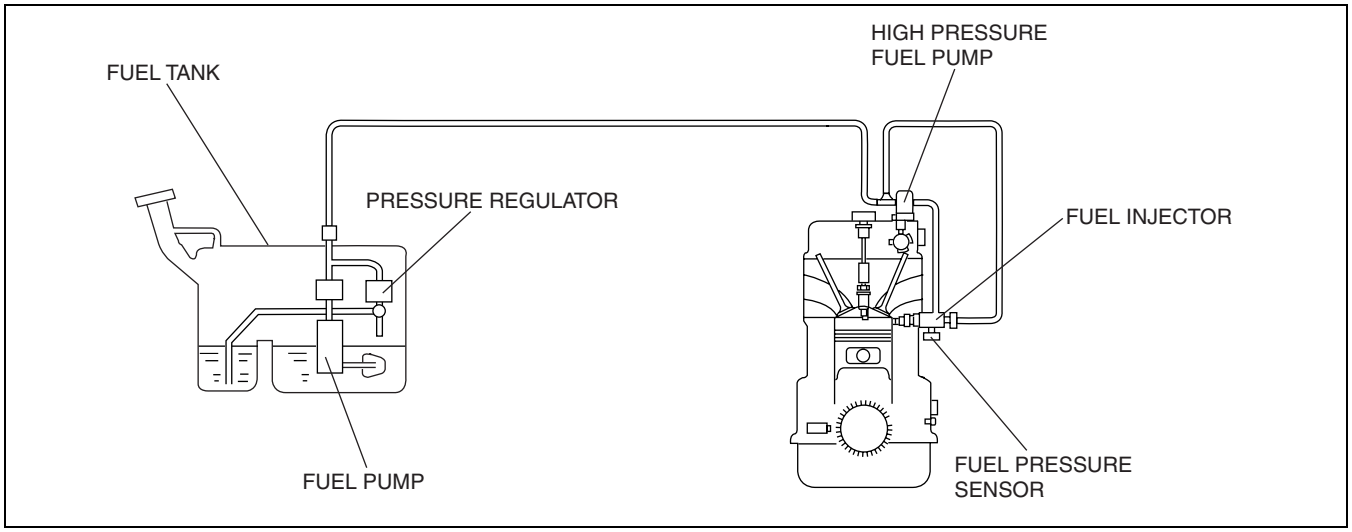
| | |
|---|---|
| 1 | Fuel tank<br>(See01-14-7 FUEL TANK REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 2 | Fuel pump unit<br>(See01-14-11 FUEL PUMP UNIT REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See01-14-13 FUEL PUMP UNIT DISASSEMBLY/ ASSEMBLY[L3 WITH TC].)<br>(See01-14-13 FUEL PUMP UNIT INSPECTION[L3 WITH TC].) |

| | |
|---|---|
| 3 | Nonreturn valve |
| 4 | Fuel filler pipe |

**FUEL SYSTEM DIAGRAM[L3 WITH TC]**

id011439800200

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## BEFORE REPAIR PROCEDURE[L3 WITH TC]

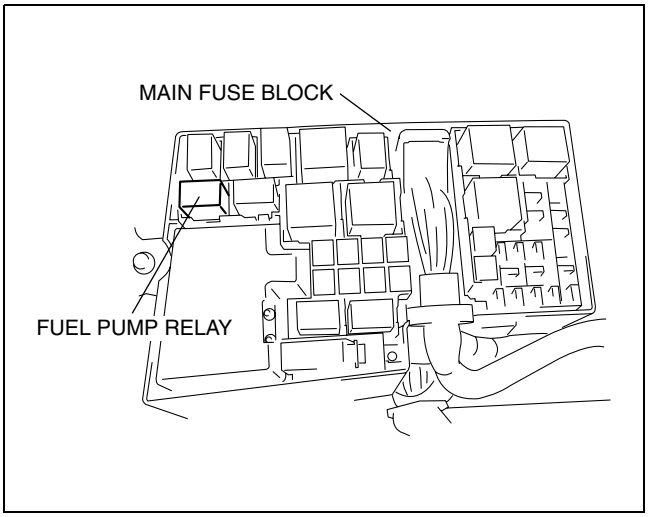
id011439800300

**Warning**
- **Fuel vapor is hazardous. It can easily ignite, causing serious injury and damage. Always keep sparks and flames away from fuel.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the following "Fuel Line Safety Procedure".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before performing work on the fuel system, discharge static electricity by touching the vehicle body.**

### Fuel Line Safety Procedure

**Note**
- Fuel in the fuel system is under high pressure even when the engine is not running.

1. Remove the fuel-filler cap and release the pressure in the fuel tank.
2. Remove the fuel pump relay.
3. Start the engine.
4. After the engine stalls, crank the engine several times.
5. Turn the ignition switch to the LOCK position.
6. Install the fuel pump relay.

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## AFTER REPAIR PROCEDURE[L3 WITH TC]

id011439800400

**Warning**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. When installing the fuel hose, perform "Fuel Leakage Inspection" described below.**

### Fuel Leakage Inspection

**Warning**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before performing work on the fuel system, discharge static electricity by touching the vehicle body.**

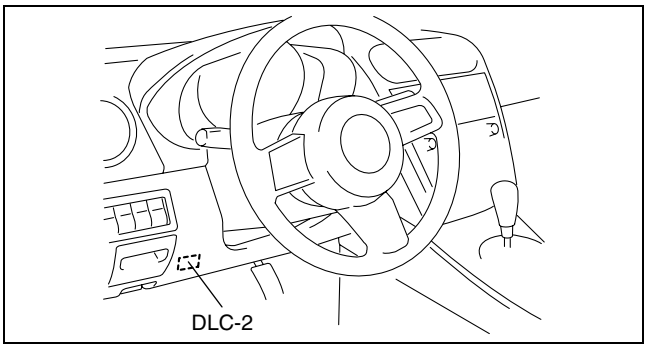
**Caution**
- **Connecting to the wrong check connector terminal may cause a malfunction. Carefully connect only to the specified terminal.**

1. Start the fuel pump using the following procedure.
   **Using M-MDS**
   1. Connect the M-MDS to the DLC-2.
   2. Using the simulation function “FP”, start the fuel pump.

   **Without using M-MDS**
   1. Disconnect the negative battery cable.
   2. Remove the fuel pump relay.

   **Caution**
   - **Short the specified terminals because shorting the wrong terminal of the main fuse block may cause malfunctions.**

   3. Using a jumper wire, short fuel pump relay terminals C and D in the main fuse block.
   4. Connect the negative battery cable and operate the fuel pump.
2. Pressurize the system in this manner for **at least 5 min** to be sure there is no leakage.
   - If there is fuel leakage, inspect the fuel hoses, hose clamps, and fuel pipe sealing surface, and replace if necessary.
3. After repair, assemble the system and repeat Steps 1 to 3.

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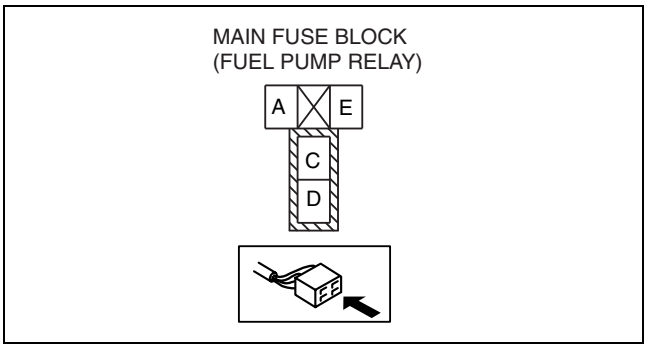


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**FUEL LINE PRESSURE INSPECTION[L3 WITH TC]**

id011439800500

**Low Pressure Line (From the Fuel Tank to the High Pressure Fuel Pump)**

**Warning**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death. Fuel can also irritate skin and eyes. To prevent this, always complete the “BEFORE REPAIR PROCEDURE”. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)**

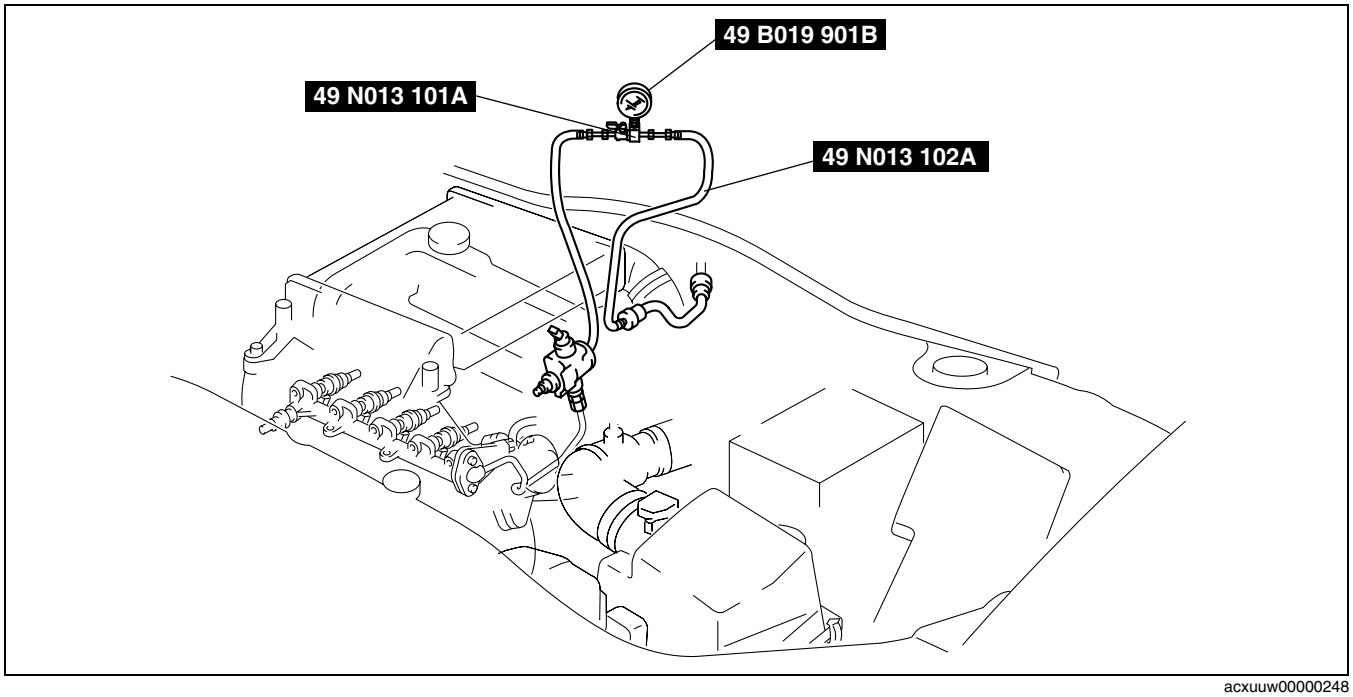
**Caution**
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using cloth or soft brush, and make sure that it is free of foreign material.**

1. Complete the “BEFORE REPAIR PROCEDURE”.
   (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC])
2. Disconnect the vacuum hose from the intake manifold that connecting to the power brake unit.
3. Disconnect the negative battery cable.

**Caution**
- **The quick release connector may be damaged if the tab is turned too far. Do not turn the tab over the stopper.**

4. Disconnect the quick release connector from the fuel tank. (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
5. Push the **SST** quick release connector into the fuel pipe and plastic fuel hose into the **SST** until a click is heard.

6. Turn the lever parallel to the hose of the **SST** as shown.

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7. Connect the vacuum hose to the intake manifold that connecting to the brake booster.
8. Connect the negative battery cable.
9. Start the engine and let it idle. Measure the fuel line pressure.
   - If not as specified, inspect the following:
     **Zero or low**
     — FP circuit
     — FP
     — Fuel line (clogged)
     — Fuel leakage inside pressure regulator
     **High**
     — Pressure regulator for high pressure cause

   **Fuel line pressure**
   **410— 490 kPa {4.2— 4.9 kgf/cm$^2$, 60— 71 psi}**

10. Turn the ignition switch to the LOCK position.
11. Measure the fuel hold pressure **after 5 min.**
    - If not as specified, inspect the following:
      — FP hold pressure
      — Fuel injector for leakage
      — Fuel line for improper routing, kinks or leakage

    **Fuel hold pressure**
    **More than 230 kPa {2.3 kgf/cm$^2$, 33 psi}**

12. Complete the “BEFORE REPAIR PROCEDURE”.
    (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC])
13. Disconnect the vacuum hose from the intake manifold that connecting to the brake booster.
14. Disconnect the **SST.**
15. Connect the quick release connector. (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/ INSTALLATION[L3 WITH TC].)

**High Pressure Line (From the High Pressure Fuel Pump to the Fuel Injector)**

1. Inspect the fuel pressure sensor. (See01-40-35 FUEL PRESSURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the high pressure fuel pump. (See01-40-35 FUEL PRESSURE SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)

## FUEL TANK REMOVAL/INSTALLATION[L3 WITH TC]

id011439801600



**Warning**

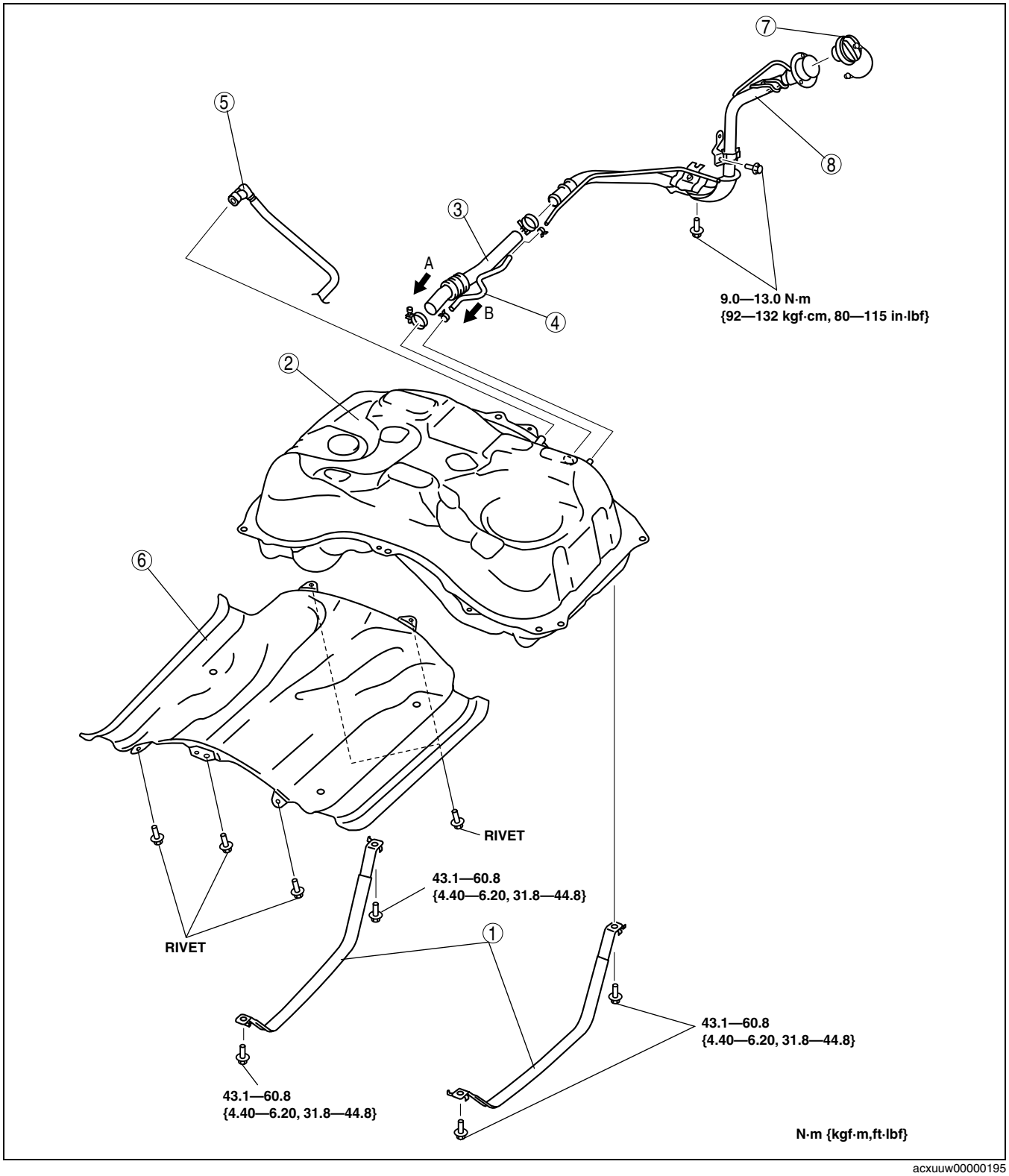
- **Repairing a fuel tank that has not been properly steam-cleaned can be dangerous. Explosion or fire may cause death or serious injury. Always properly steam clean a fuel tank before repairing it.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, do not damage the sealing surface of the fuel pump unit when removing or installing.**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

**Caution**

- **Disconnecting/connecting the quick release connector without cleaning it may cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**

1. Level the vehicle.
2. Complete the “BEFORE REPAIR PROCEDURE”. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
3. Disconnect the negative battery cable.
4. Remove the rear seat cushion.
5. Remove the fuel pump unit. (See01-14-11 FUEL PUMP UNIT REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the fuel gauge sender unit.
7. Siphon the fuel from the fuel tank.
8. Remove the middle pipe. (See01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
9. Remove the propeller shaft. (4WD) (See03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
10. Remove the rear under cover (LR, RR).
11. Remove the rear parking brake cable installation bolts, then move the rear parking brake cable out of the way.
12. Disconnect the joint hose connected between the fuel tank and the fuel-filler pipe from the fuel-filler pipe.
13. Disconnect the breather hose connected between the fuel tank and the fuel-filler pipe from the fuel-filler pipe.
14. Disconnect the evaporative hose connected between the fuel tank and the charcoal canister from the charcoal canister.

15. Remove in the order indicated in the table.

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| | |
|---|---|
| 1 | Strap |
| 2 | Fuel tank |
| 3 | Joint hose (See 01-14-9 Joint Hose Installation Note) |
| 4 | Breather hose (See 01-14-10 Breather Hose Installation Note) |

| | |
|---|---|
| 5 | Evaporative hose (See 01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC]) |
| 6 | Insulator (See 01-14-9 Rivet Removal Note) |
| 7 | Fuel-filler cap |
| 8 | Fuel-filler pipe (See 01-14-9 Fuel-filler Pipe Removal Note) |

16. Install in the reverse order of removal.
17. Complete the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

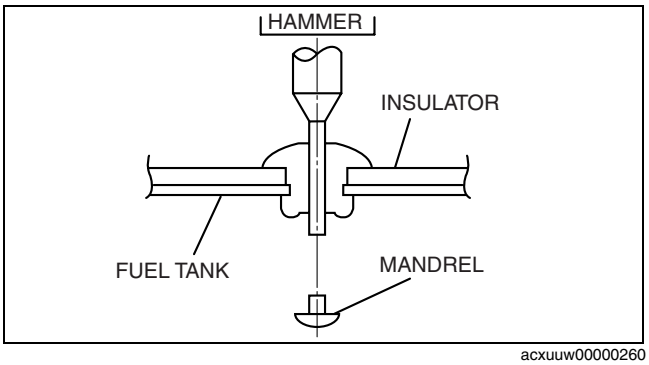
**Rivet Removal Note**

**Caution**
- **Be careful not to damage the fuel tank when removing the rivet. If the fuel tank is damaged, it may cause fuel leakage.**



**Note**
- The insulator is installed using rivets.
- When resin stalling the rivet, install the same rivet or M5 bolt and nut.

1. Push out the mandrel using a hammer and punch (**2—2.8 mm {0.08—0.11 in}** diameter).

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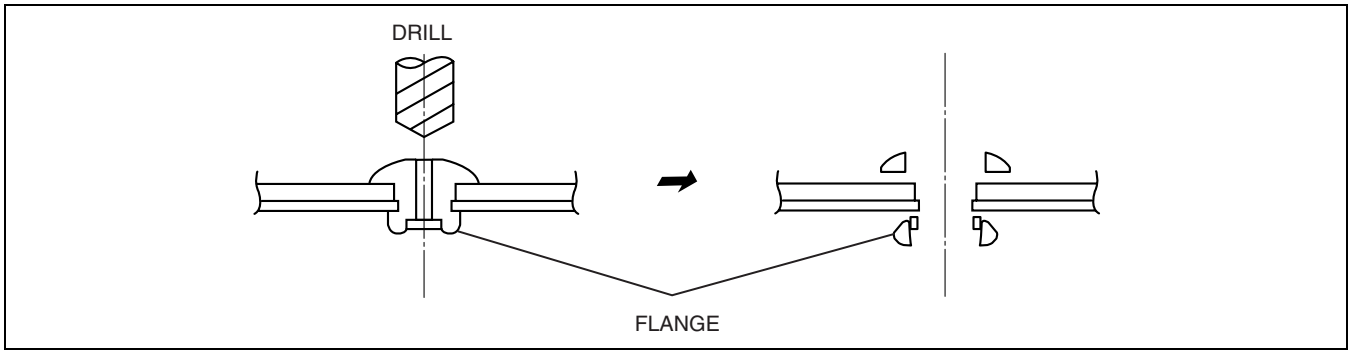
2. Remove the flange using a drill (5 mm {0.20 in} drill bit).

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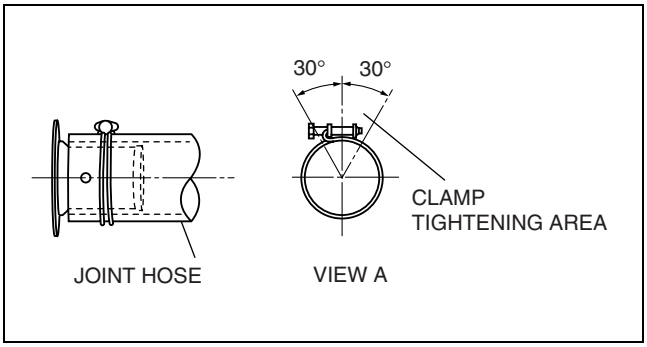
**Fuel-filler Pipe Removal Note**
1. Remove the rear tire (LH).
2. Remove the mudguard (LH).
3. Remove the air filter.
4. Remove the fuel-filler pipe.

**Joint Hose Installation Note**
1. Install the joint hose and clamp as shown in the figure.

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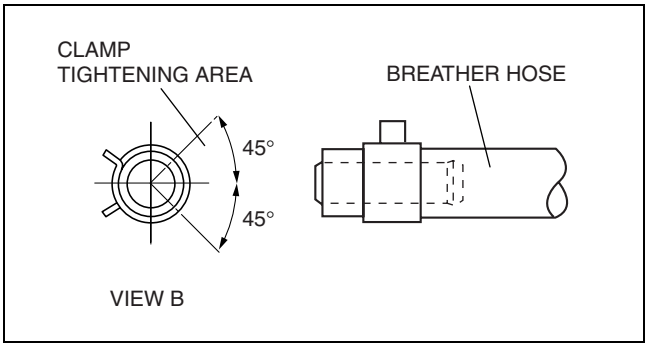
**Breather Hose Installation Note**

1. Install the breather hose and clamp as shown in the figure.

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**FUEL SHUT-OFF/ROLLOVER VALVE INSPECTION[L3 WITH TC]**

id011439801800

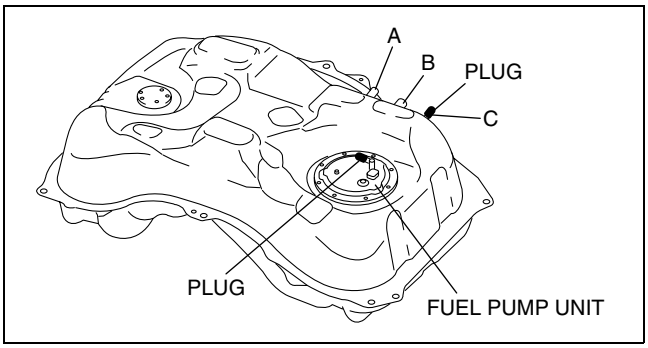
**Caution**

- **Disconnecting/connecting the quick release connector without cleaning it may cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**

**Note**

- This inspection is for fuel shut-off valve and rollover valve integrated in the fuel tank.

1. Disconnect the quick release connector and the fuel pump unit connector. (See01-14-11 FUEL PUMP UNIT REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the fuel tank with the fuel pump unit. (See01-14-7 FUEL TANK REMOVAL/INSTALLATION[L3 WITH TC].)
3. Plug the port as shown in the figure.
4. Level the fuel tank.

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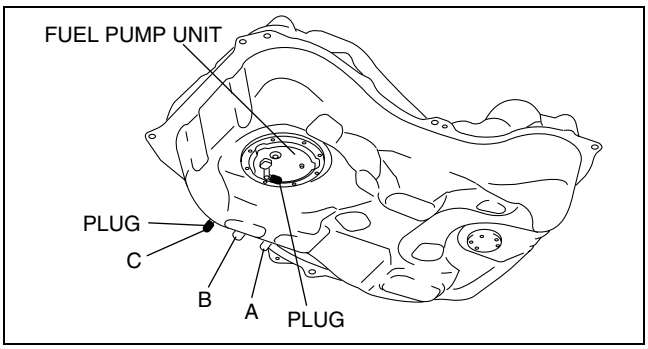
5. Blow through port B and verify that there is airflow from port A.
   - If there is no airflow, replace the fuel tank.
   - If there is airflow, turn the fuel tank upside down, and proceed to Step 6.
6. Blow through port B and verify that there is no airflow from port A.
   - If there is airflow, replace the fuel tank.

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## FUEL PUMP UNIT REMOVAL/INSTALLATION[L3 WITH TC]

id011439800900



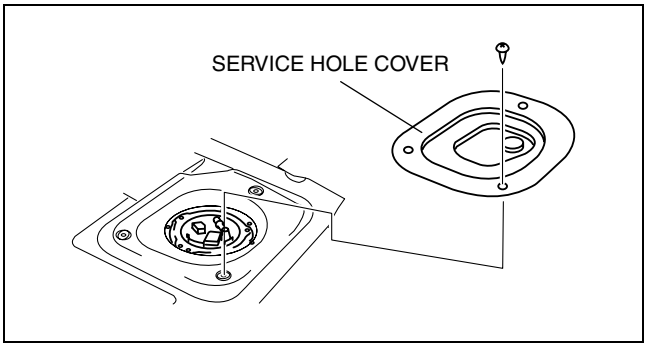
**Warning**

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure".**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the "Fuel Leak Inspection After Fuel Pump Unit Installation".**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

**Caution**

- **Because the fuel tank is constructed such that the fuel level is higher than the installation surface of the fuel pump, fuel leakage could occur. If the fuel gauge indicates a fuel level of half or more, perform the following Steps 1-6 to drain approx. 10 L {11 US gal, 8.8 Imp gal} of fuel.**
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**
- **To prevent the SST from coming off the fuel pump cap while performing the work, always perform the removal/installation procedure with 2 people. One person presses the SST against cap from directly above, while the other person rotates the SST.**

1. Complete the "BEFORE REPAIR PROCEDURE". (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Remove the rear seat cushion.
3. Remove the service hole cover.

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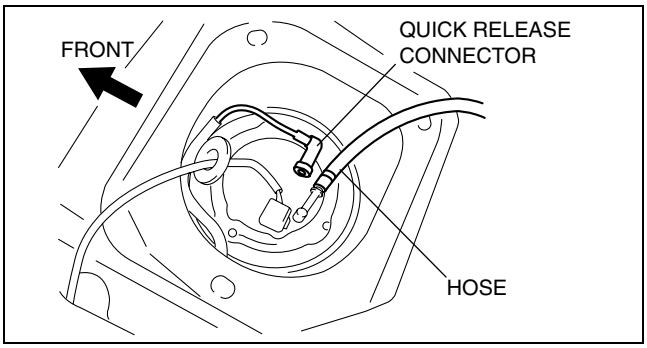
4. Disconnect the quick release connector connected to the fuel pump unit.
5. Connect a long hose to the disconnected quick release connector and drain the fuel into a container used for collecting gasoline.

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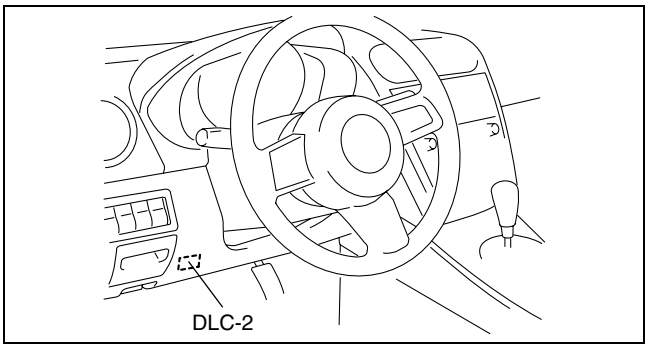
6. Start the fuel pump using the following procedure.
   **Using M-MDS**
   1. Connect the M-MDS to the DLC-2.
   2. Using the simulation function “FP”, start the fuel pump.

   **Without using M-MDS**
   1. Remove the fuel pump relay.

   **Caution**
   - **Short the specified terminals because shorting the wrong terminal of the main fuse block may cause malfunctions.**



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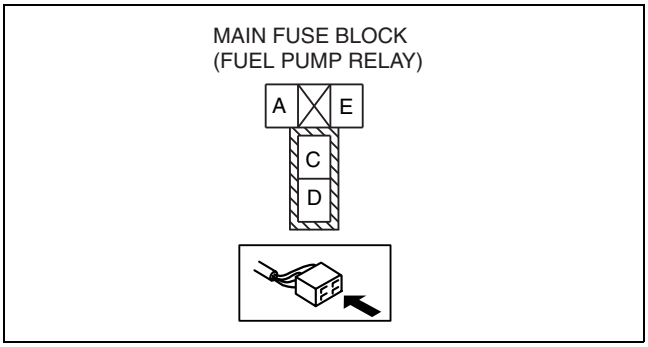
   2. Using a jumper wire, short fuel pump relay terminals C and D in the main fuse block.
   3. Connect the negative battery cable and operate the fuel pump.

   **Caution**
   - **The fuel pump could be damaged if it is operated (fuel pump idling) while there is no fuel in the fuel tank. Verify the amount of fuel being discharged from the hose and stop operation of the fuel pump when essentially no fuel is being discharged.**



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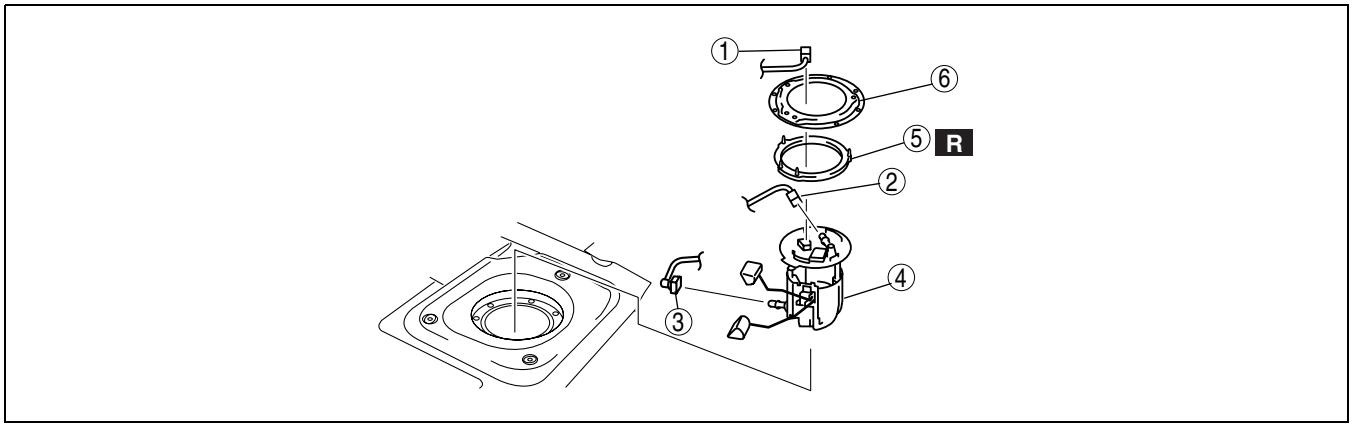
7. When essentially no fuel is being discharged, stop the fuel pump.
   **Using M-MDS**
   1. Using the simulation function “FP”, stop the fuel pump.

   **Without using M-MDS**
   1. Turn the ignition switch to LOCK position to stop the fuel pump.
   2. Disconnect the jumper wire from the check connector.
8. Disconnect the negative battery cable.
9. Remove the fuel pump bracket installation screws.
10. Remove in the order indicated in the table.



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| | |
|---|---|
| 1 | Connector |
| 2 | Quick release connector (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC]) |
| 3 | Quick release connector (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC]) |
| 4 | Fuel pump unit |
| 5 | Packing |
| 6 | Fuel pump bracket |

11. Install in the reverse order of removal.
12. Complete the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

## FUEL PUMP UNIT DISASSEMBLY/ASSEMBLY[L3 WITH TC]

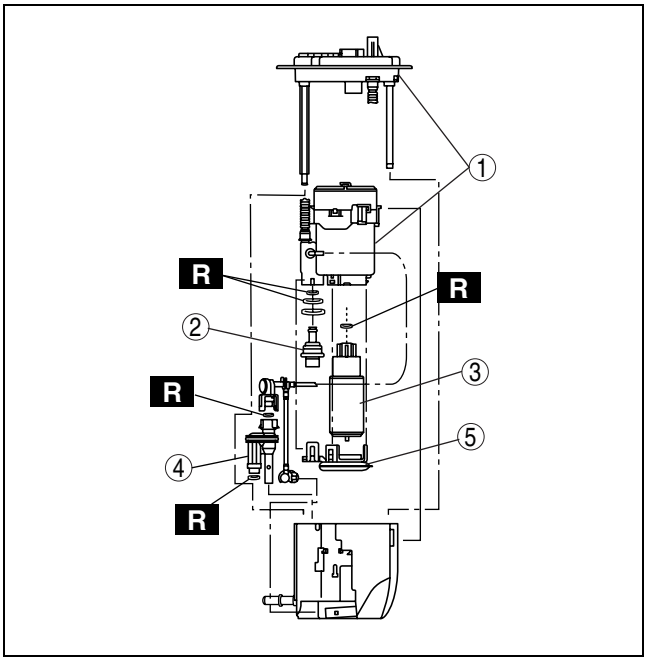
id011439801000

**Warning**

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, do not damage the sealing surface of the fuel pump unit when removing or installing.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

| | |
|---|---|
| 1 | Fuel filter body |
| 2 | Fuel pressure regulator |
| 3 | Fuel pump |
| 4 | Transfer |
| 5 | Filter |

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## FUEL PUMP UNIT INSPECTION[L3 WITH TC]

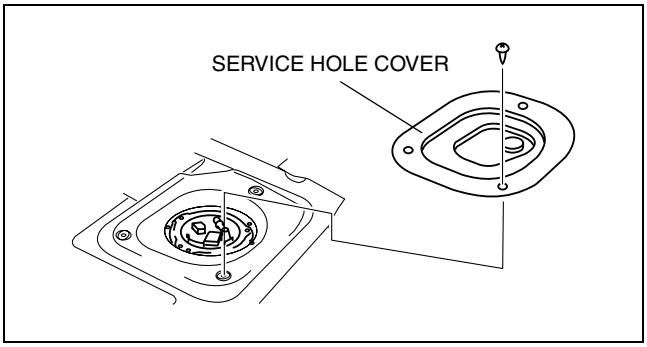
id011439801100

### Continuity Inspection

**Note**

- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the rear seat cushion.
3. Remove the service hole cover.
4. Disconnect the fuel pump unit connector.

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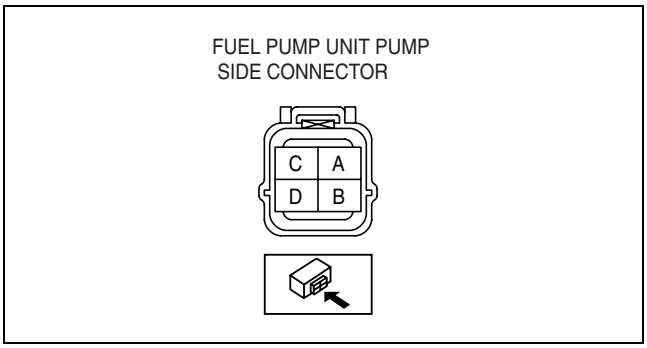
5. Inspect for continuity between fuel pump unit connector terminals B and D.
   - If there is no continuity, replace the fuel pump body.
   - If as specified, carry out the “Circuit Open/ Short Inspection”.

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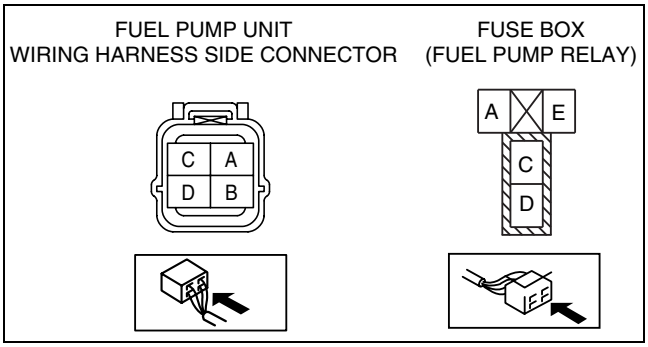
**Circuit Open/Short Inspection**

1. Inspect the following wiring harnesses as for open or short circuit (continuity check).

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**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Fuel pump unit terminal B and fuel pump relay terminal A
  - — Fuel pump unit terminal D and body ground

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Fuel pump unit terminal B and power supply
  - — Fuel pump unit terminal B and body ground
  - — Fuel pump unit terminal D and power supply

**Fuel Pump Hold Pressure Inspection**

**Warning**

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Always carry out the following procedure with the engine stopped.**

**Caution**

- **Disconnecting/connecting the quick release connector without cleaning it may cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**

**Note**

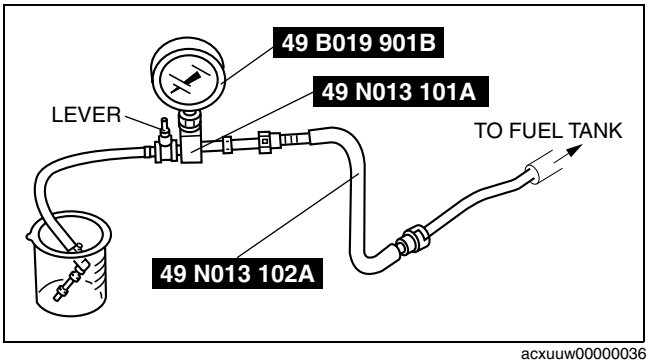
- Perform the following test only when directed.

1. Complete the “BEFORE REPAIR PROCEDURE”. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Disconnect the negative battery cable.
3. Remove the battery and battery tray.

**Caution**

- **The quick release connector may be damaged if the tab is bent excessively. Do not expand the tab over the stopper.**

4. Disconnect the quick release connector from the fuel tank. (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
5. Turn the lever **90**° against the hose of the **SST** to plug the **SST** outlet.
6. Push the **SST** quick release connector into the fuel pipe until a click is heard.
7. Set the fuel hose into a container to avoid fuel spills.

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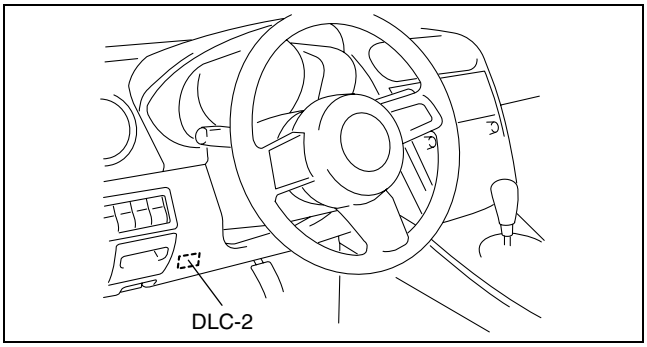
8. Start the fuel pump using the following procedure.
   **Using M-MDS**
   1. Connect the negative battery cable.
   2. Connect the M-MDS to the DLC-2.
   3. Using the simulation function “FP”, start the fuel pump.

   **Without using M-MDS**
   1. Remove the fuel pump relay.

      **Caution**
      - **Short the specified terminals because shorting the wrong terminal of the main fuse block may cause malfunctions.**

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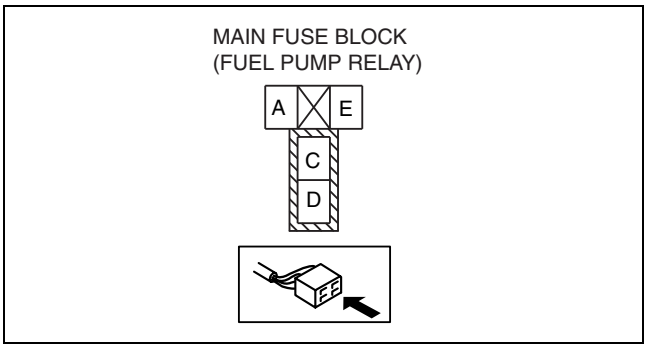
   2. Using a jumper wire, short fuel pump relay terminals C and D in the main fuse block.
   3. Connect the negative battery cable and operate the fuel pump.

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9. Turn the ignition switch to the LOCK position.
10. Measure the fuel pump hold pressure **after 5 min**.
    - If not as specified, replace the fuel pump after inspecting the following:
      — Fuel line for clogging or leakage

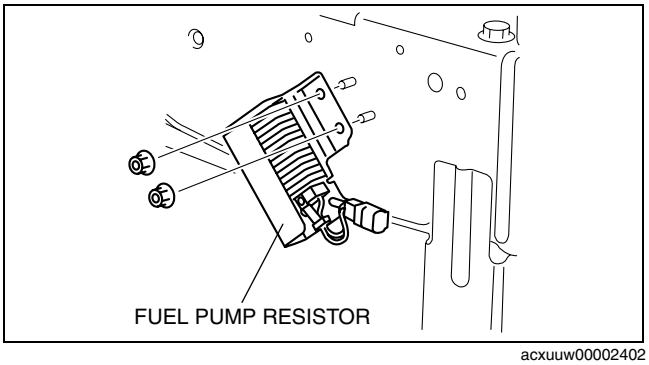
    **Fuel pump hold pressure**
    **More than 230 kPa {2.3 kgf/cm$^2$, 33 psi}**

11. Disconnect the jumper wire.
12. Disconnect the **SST**.
13. Connect the quick release connector. (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)

**FUEL PUMP RESISTOR REMOVAL/INSTALLATION[L3 WITH TC]**

id011439801200

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the air cleaner. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Disconnect the fuel pump resistor connector.
4. Remove in the fuel pump resistor.

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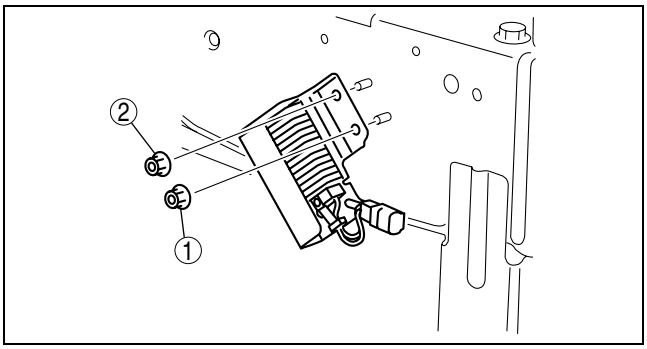
5. Install in the order as shown in the figure.

   **Tightening torque**
   **4.2— 6.2 N·m {43— 63 kgf·cm, 38— 54 in·lbf}**

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6. Connect the fuel pump resistor connector.

## FUEL PUMP RESISTOR INSPECTION[L3 WITH TC]

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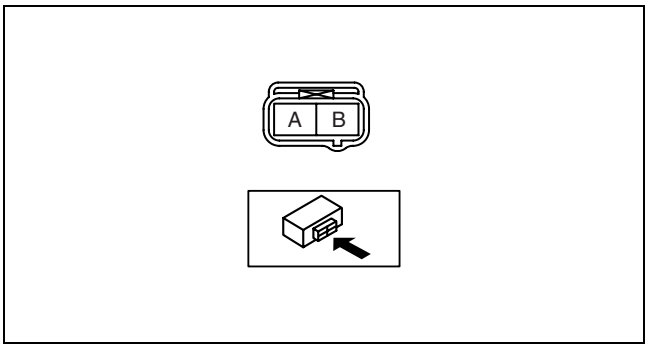
**Resistance Inspection**

1. Disconnect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the fuel pump resister. (See 01-14-15 FUEL PUMP RESISTOR REMOVAL/INSTALLATION[L3 WITH TC].)
3. Verify that the continuity between the fuel pump resister terminal A and B is within the specification.
   - If not within the specification, replace the fuel resistor.

   **Fuel pump resistor continuity**
   **0.304— 0.336 ohms (20 °C {68 °F})**

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## HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC]

id011439801400

**Caution**

- **Do not disassemble the high pressure fuel pump.**
- **Do not scratch or damage the fuel sealing surface of the high and low fuel ports.**
- **When removing the high pressure fuel pipe, secure the joint (pump side) so that it dose not rotate, and loosen the screw (pipe side).**

**Note**

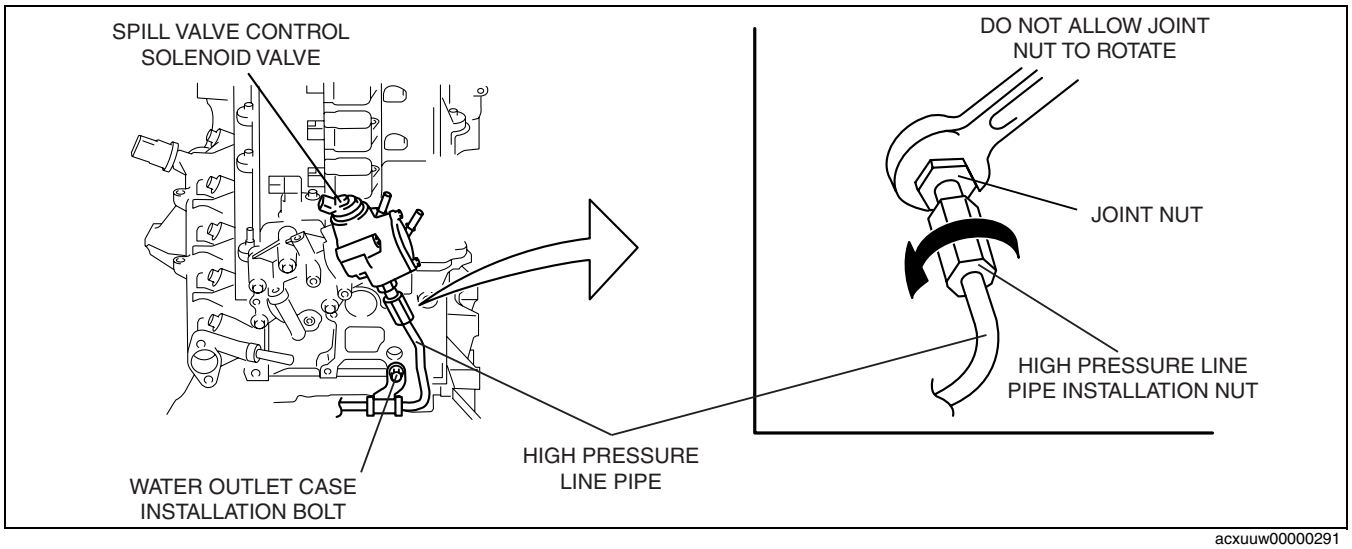
- If the high pressure fuel pump is removed, replace the O-ring with a new one.

1. Complete the “BEFORE REPAIR PROCEDURE”. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Disconnect the negative battery cable.
3. Remove the charge air cooler duct.
4. Disconnect the spill valve control solenoid valve connector.
5. Disconnect the quick release connector on the high pressure fuel pump. (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the battery and battery tray. (See01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove the air duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])

**Warning**

- **If the high pressure fuel pump joint nut is loosened, fuel leakage may occur resulting in death or serious injury, or damage to the equipment or the vehicle. Fuel can also irritate the skin and eyes. When removing the high pressure line pipe, always tighten the high pressure line pipe installation nut while fixing the high pressure fuel pump joint nut with a wrench. If the high pressure fuel pump joint nut has rotated, replace the high pressure fuel pump with a new one.**

8. Disconnect the high pressure line pipe of the high pressure fuel pump.

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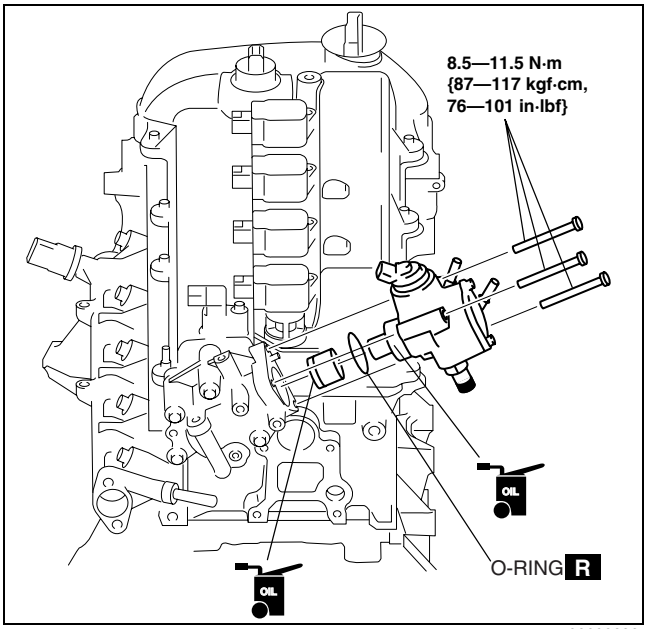
(1) Fix the joint nut with a wrench on the high pressure fuel pump side as shown in the figure.
(2) Loosen the high pressure line pipe installation nut.

9. Drain engine coolant. (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
10. Loosen the water outlet case installation bolts securing the high pressure line pipe.
11. Remove the high pressure fuel pump.

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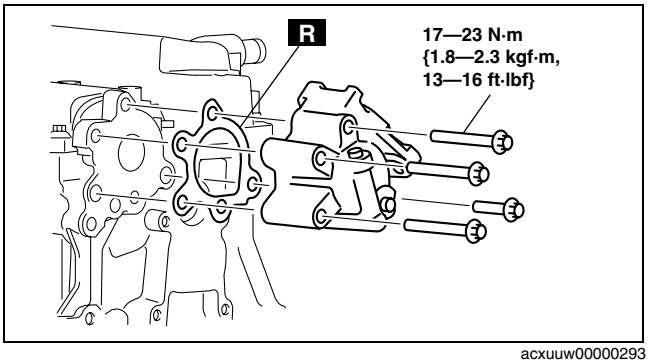
12. Remove the high pressure fuel pump cover.
13. Tighten the bolts on the high pressure fuel pump cover.

**Tightening torque**
**17— 23 N·m {1.8— 2.3 kgf·m, 13— 16 ft·lbf}**

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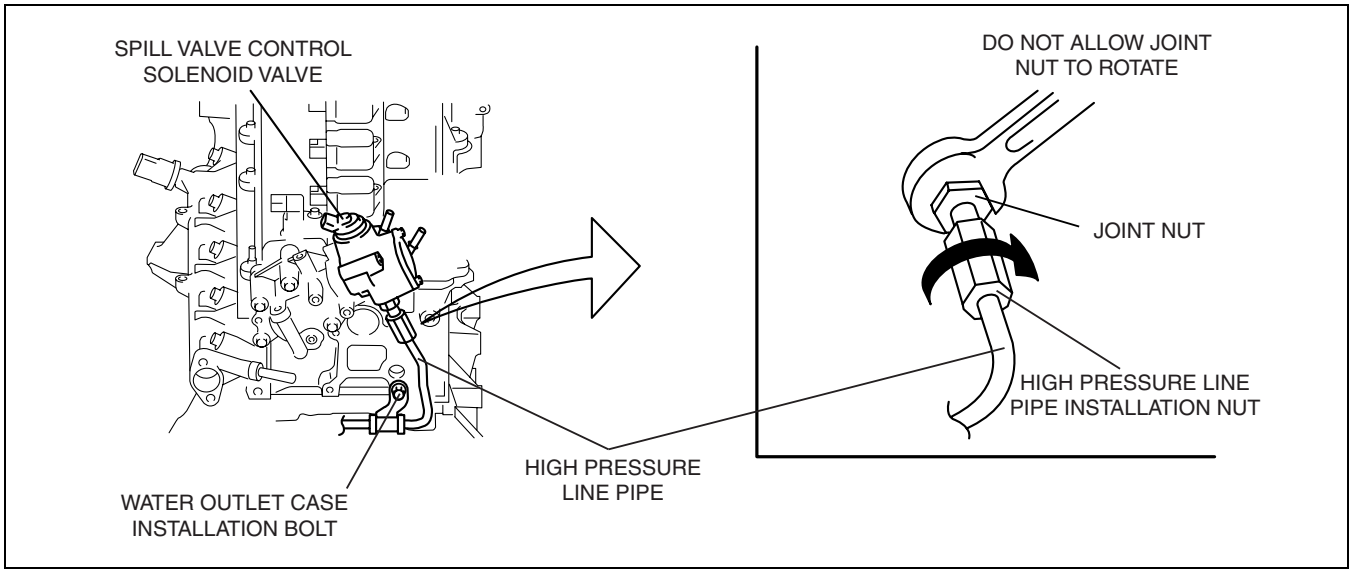
**Caution**
- **If the high pressure fuel pump installation bolts are tightened with the high pressure fuel pump tilted, the high pressure fuel pump may not operate correctly. Tighten the high pressure fuel pump installation bolts in a few passes with equal torque.**

14. Tighten the bolts on the high pressure fuel pump.

**Tightening torque**
**8.5— 11.5 N·m {87— 117 kgf·cm, 76— 101 in·lbf}**

**Warning**
- **If the high pressure fuel pump joint nut is loosened, fuel leakage may occur resulting in death or serious injury, or damage to the equipment or the vehicle. Fuel can also irritate the skin and eyes. When installing the high pressure line pipe, always tighten the high pressure line pipe installation nut while fixing the high pressure fuel pump joint nut with a wrench. If the high pressure fuel pump joint nut has rotated, replace the high pressure fuel pump with a new one.**

15. Assemble the high pressure line pipe.

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(1) Fix the joint nut with a wrench on the high pressure fuel pump side as shown in the figure.
(2) Tighten the high pressure line pipe installation nut.

**Tightening torque**
**23.5— 35.5 N·m {2.40— 3.59 kgf·m, 17.4— 26.0 ft·lbf}**

16. Tighten the water outlet case installation bolts.

**Tightening torque**
**8— 11.5 N·m {82— 117 kgf·cm, 71— 101 in·lbf}**

17. Install the quick release connector. (See01-14-19 QUICK RELEASE CONNECTOR REMOVAL/ INSTALLATION[L3 WITH TC].)

**Fuel Leakage Inspection After High Pressure Fuel Pump Installation**
1. Verify that the high pressure fuel pump is assembled securely.
2. Drive the vehicle starting from a standstill and brake suddenly **five to six times** at a low speed.
3. Stop the vehicle and verify from outside the vehicle that there is no fuel leakage around the high pressure fuel pump.

## HIGH PRESSURE FUEL PUMP INSPECTION[L3 WITH TC]

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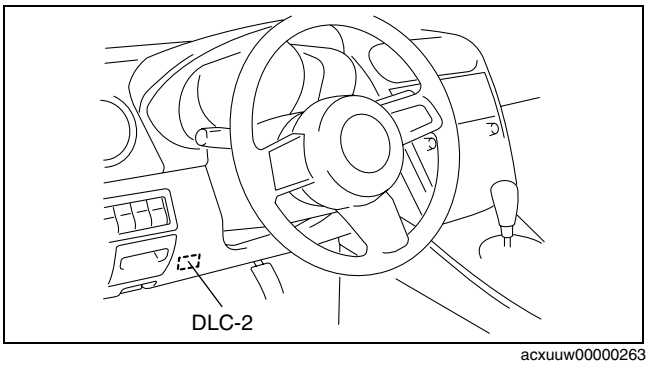
**Note**
- Perform the following inspection only when directed.
- The following vacuum values are indicated by relative pressure from the fuel pressure sensor.

1. Verify that the fuel pressure sensor is normal. (See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].)
2. Connect the M-MDS to the DLC-2.
3. Turn the ignition switch to the ON position (Engine off).
4. Select the FUEL_PRES, and LOAD, RPM PIDs on the M-MDS.

**Caution**
- **If the engine is run at a high speed, it could be damaged. When racing the engine, do not race it up to 6,700 rpm or more.**

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5. After the LOAD PID is **60% or more** while the engine is raced with the accelerator pedal fully depressed, verify that the FUEL_PRES PID is **approx. 11.5Mpa**.
   — If not as verified, replace the high pressure fuel pump.

## QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC]

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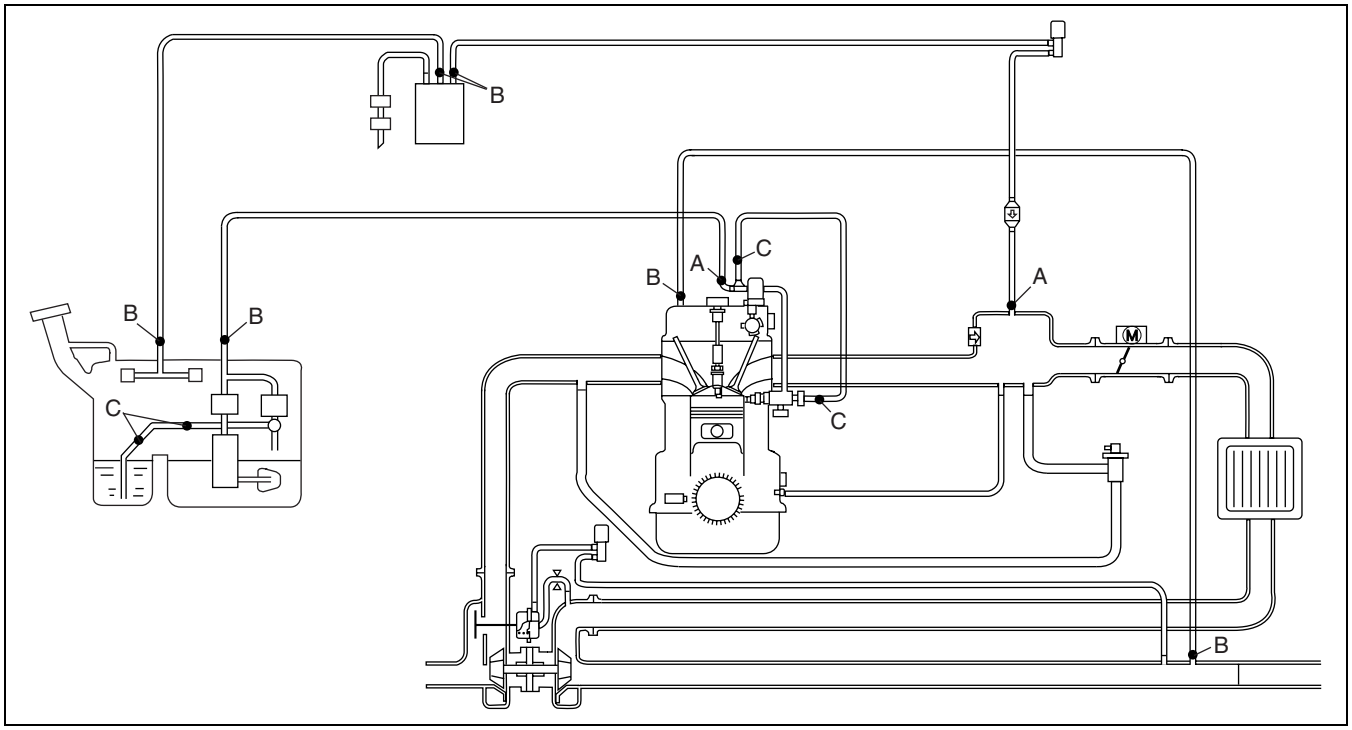
**Warning**
- **Fuel is very flammable liquid. If fuel spills or leaks from the pressurized fuel system, it will cause serious injury or death and facility breakage. Fuel can also irritate skin and eyes. To prevent this, always complete the "Fuel Line Safety Procedure", while referring to the "BEFORE SERVICE PRECAUTION".**

### Quick Release Connector Type

**Caution**
- **There are three types of quick release connectors. Verify the type and location, and install/remove properly.**

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**Type A Removal**

1. Follow “BEFORE REPAIR PROCEDURE” before performing any work operations to prevent fuel from spilling from the fuel system. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)

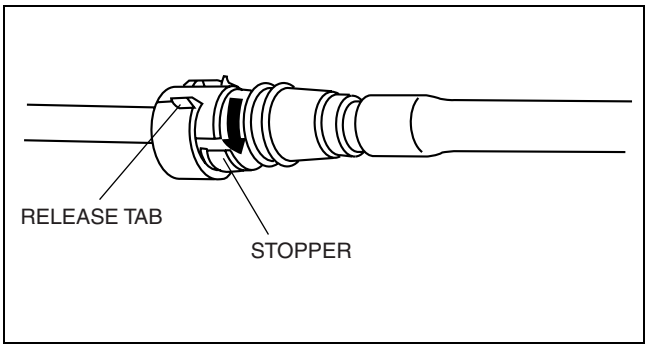
**Caution**

- **The quick release connector may be damaged if the release tab is bent excessively. Do not expand the release tab over the stopper.**

**Note**

- The fuel hose can be removed by pushing it to the pipe side to release the lock.

2. Rotate the release tab on the quick release connector to the stopper position.

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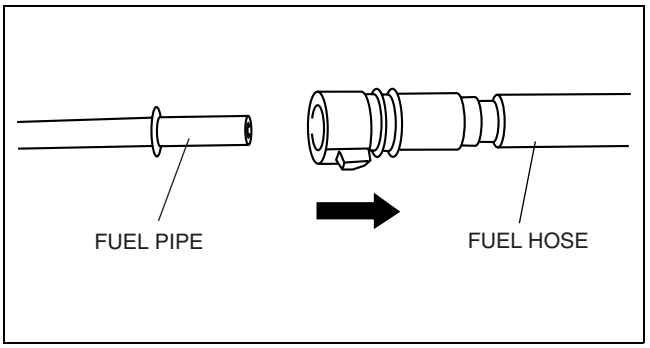
3. Pull out the fuel hose straight from the fuel pipe and disconnect it.

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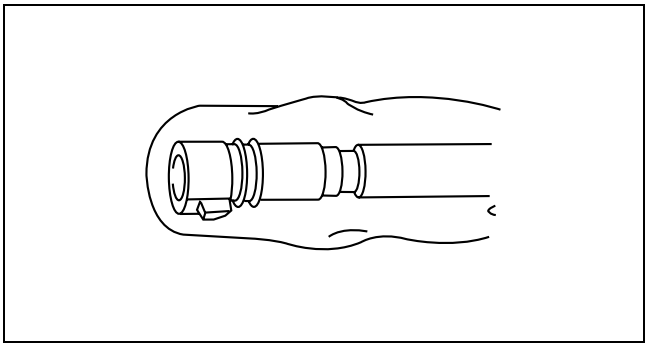
4. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.



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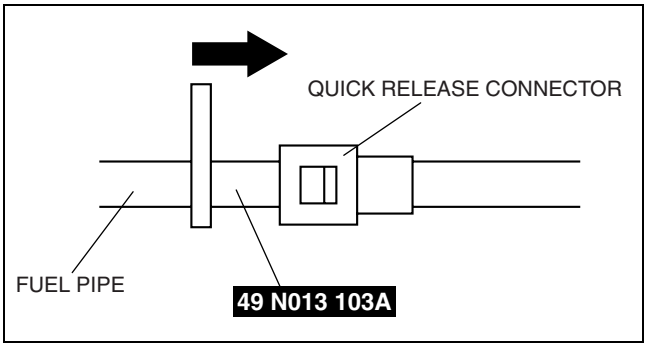
**Type B Removal**

**Caution**
- **Be careful not to damage the pipe when unlocking the retainer.**

**Note**
- When removing the quick connector, either SST 49 E042 001 or 49 N013 103A.

**When using SST 49 N013 103A**

1. Follow “BEFORE SERVICE PRECAUTION” and remove dirt from the connecting surfaces before performing any work operations. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Insert the SST into the quick release connector.
3. Pull out the fuel hose straight from the fuel pipe and disconnect it.
4. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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**When using SST 49 E042 001**

**Note**
- If the quick release connector is removed, replace the retainer with a new one.

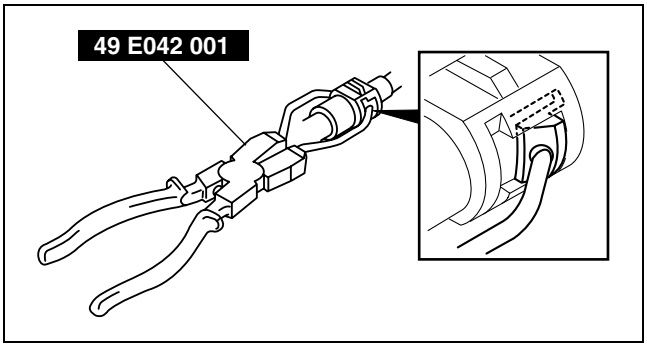
1. Follow “BEFORE SERVICE PRECAUTION” and remove dirt from the connecting surfaces before performing any work operations. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)

**Note**
- The retainer is attached to the pipe even after the connector is disconnected.

2. Set the **SST** parallel to the quick release connector.

**Note**
- The quick release connector can be removed by pushing the center of the retainer tabs.

3. Hold the center of the retainer tabs with the **SST** ends and press the retainer.
4. Pull the connector side and disconnect the quick release connector.

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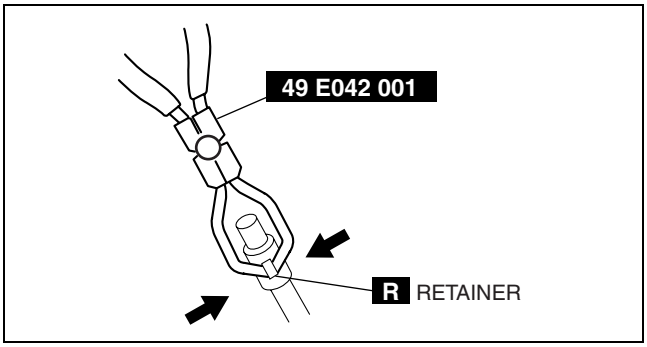
5. Raise a retainer tab using the **SST** and remove the retainer.
6. Cover the disconnected quick release connector and evaporative hose with vinyl sheeting or a similar material to prevent it from scratches or dirt.

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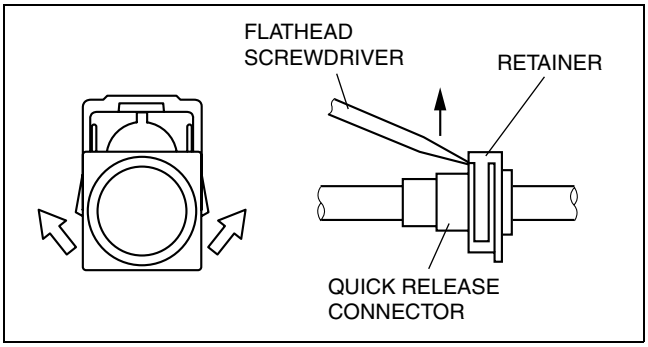
**Type C Removal**

1. Follow “BEFORE REPAIR PROCEDURE” and remove dirt from the connecting surfaces before performing any work operations. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Move the retainer upward using a small flathead screwdriver or a similar tool.
3. Pull out the fuel hose straight from the fuel pipe and disconnect it.

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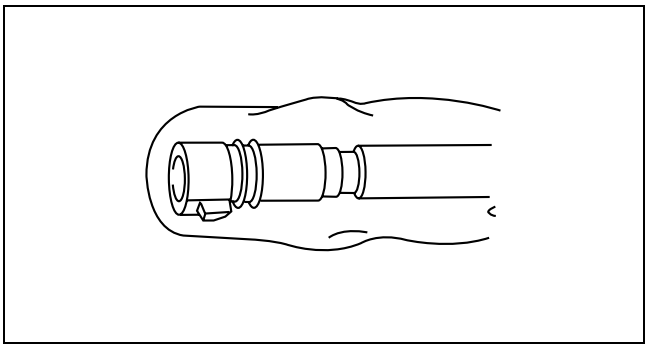
4. Cover the disconnected quick release connector and fuel pipe with vinyl sheeting or a similar material to prevent it from scratches or dirt.



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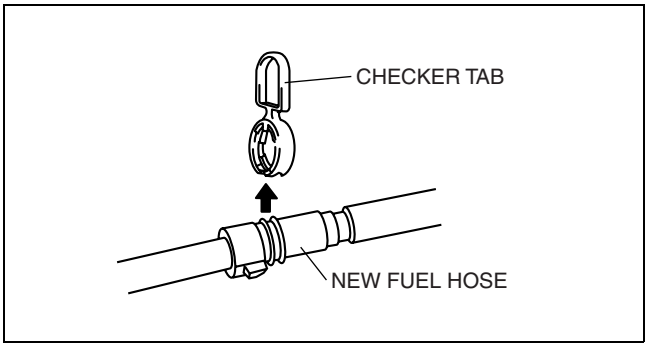
**Type A Installation**

**Note**

- If the quick release connector O-ring is damaged or has slipped, replace the fuel hose.
- A checker tab is integrated with the quick release connector for new fuel hoses and evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel pipe.

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1. Inspect the fuel hose and fuel pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Apply a small amount of clean engine oil to the sealing surface of the fuel pipe.
3. Reconnect the fuel hose straight to the fuel pipe until a click is heard.

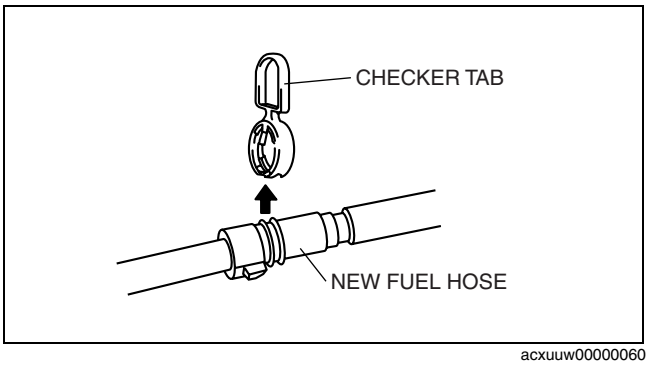
**Note**

- If the quick release connector does not move at all, disconnect it, verify that the O-ring is not damaged or has not slipped, and then reconnect the quick release connector.

4. Lightly pull and push the quick release connector a few times by hand, and then verify that it can move **2.0— 3.0 mm {0.08— 0.12 in}** and is connected securely.
5. Inspect all related parts by performing “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

**Type B Installation**

**Note**
- If the quick release connector O-ring is damaged or has slipped, replace the fuel hose.
- A checker tab is integrated with the quick release connector for new fuel hoses and evaporative hoses. Remove the checker tab from the quick release connector after the connector is completely engaged with the fuel pipe.

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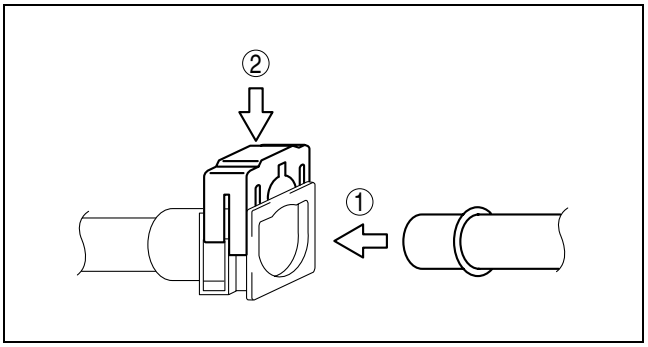
**Caution**
- **Be sure to replace the retainer with a new one to prevent gas leakage.**
- **To prevent evaporative gas leakage, be sure not to damage the connecting part between the charcoal canister and pipe, and the locks between the quick release connector and retainer. If any of them are damaged, replace the charcoal canister or hose with a new one.**

1. Remove the retainer remaining on the charcoal canister pipe.
2. Install a new retainer to the quick release connector.
3. Reconnect the hose straight to the pipe until a click is heard.
4. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.
5. Inspect all related parts by performing “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

**Type C Installation**

**Note**
- If the quick release connector O-ring is damaged or has slipped, replace the fuel hose.

1. Inspect the fuel hose and fuel pipe sealing surface for damage and deformation.
   - If there is any malfunction, replace it with a new one.
2. Install the quick release connector.
   - Insert the fuel pipe straight to the end of the quick release connector.
   - Push down the retainer using a finger.
     - — If the retainer cannot be pushed down, push the fuel pipe further to the quick release connector.
3. Lightly pull and push the quick release connector a few times by hand, and then verify that it is connected securely.
4. Inspect all related parts by performing “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

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**FUEL INJECTOR REMOVAL/INSTALLATION[L3 WITH TC]**

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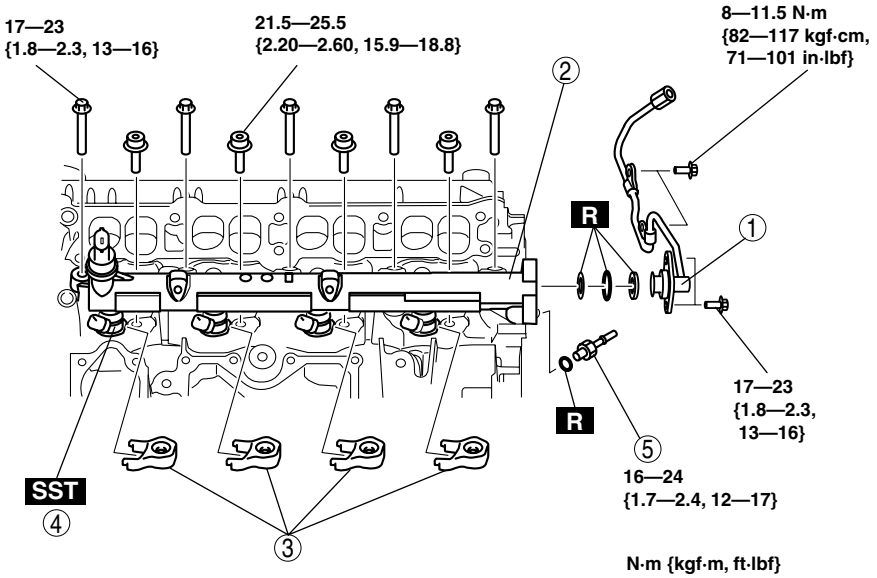
**Caution**
- **Disconnecting/connecting the quick release connector without cleaning it may cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**

**Note**
- When the fuel pressure sensor replaces, replace a new fuel delivery pipe with a new fuel pressure sensor.(See 01-14-23 FUEL INJECTOR REMOVAL/INSTALLATION[L3 WITH TC])

1. Complete the “BEFORE REPAIR PROCEDURE”. (See01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Disconnect the negative battery cable.
3. Remove the intake manifold. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove in the order indicated in the table.

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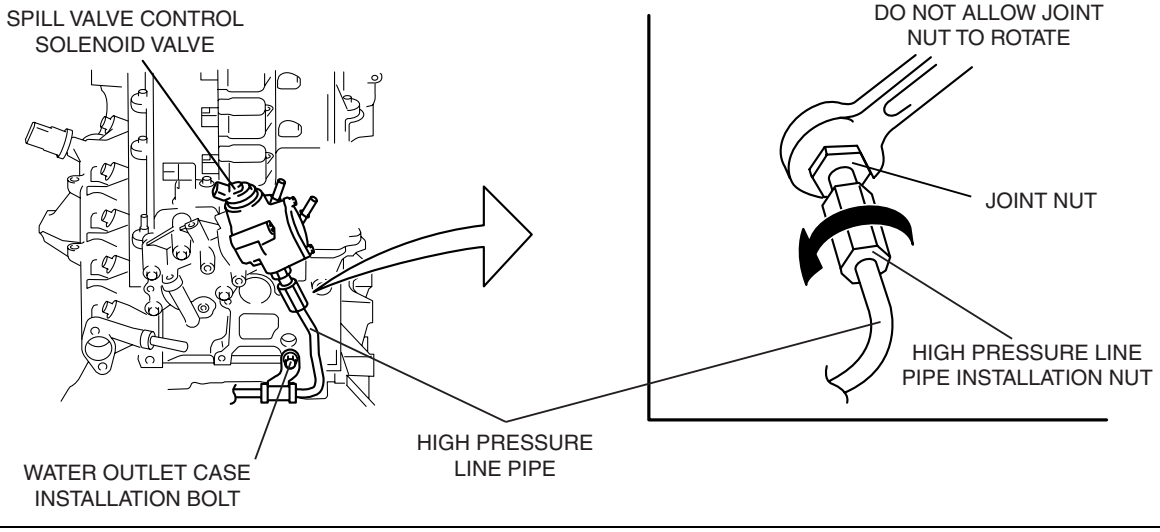
| | |
|---|---|
| 1 | High pressure line pipe<br>(See01-14-24 High Pressure Line Pipe Removal Note.)<br>(See01-14-26 High Pressure Line Pipe Installation Note.) |

| | |
|---|---|
| 2 | Fuel delivery pipe<br>(See01-14-26 Fuel Delivery Pipe Installation Note.) |
| 3 | Fuel injector bracket |
| 4 | Fuel injector<br>(See01-14-25 Fuel Injector Removal Note.) |
| 5 | Relief valve |

5. Install in the reverse order of removal.
6. Complete the “AFTER REPAIR PROCEDURE”. (See01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

**High Pressure Line Pipe Removal Note**

1. Drain engine coolant. (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
2. Disconnect the high pressure line pipe of the high pressure fuel pump. (See01-14-16 HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION[L3 WITH TC].)

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(1) Fix the joint nut with a wrench on the high pressure fuel pump side as shown in the figure.
(2) Loosen the high pressure line pipe installation nut.

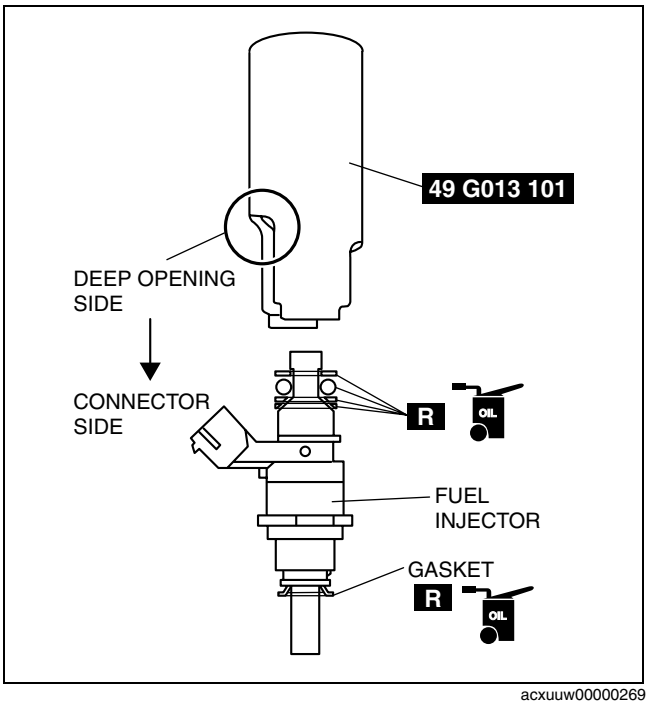
3. Remove the high pressure line pipe.

**Fuel Injector Removal Note**

**Note**
- Depending on the driving conditions, carbon may accumulate on the inserted part of the fuel injector, causing the fuel injector to stick. Remove the fuel injector using the following procedure.

1. Install the **SST** to the fuel injector confirming that the **SST** faces the correct direction as shown in the figure.

**Caution**
- **If the SST slips while ratcheting up the fuel injector, the fuel injector or surrounding parts could be damaged. Press fit the SST to the fuel injector firmly and operate carefully.**
- **When ratcheting up the fuel injector, the fuel injector connector may contact the cylinder head and damage the fuel injector. Ratchet up the fuel injector so that the fuel injector connector does not contact the cylinder head.**

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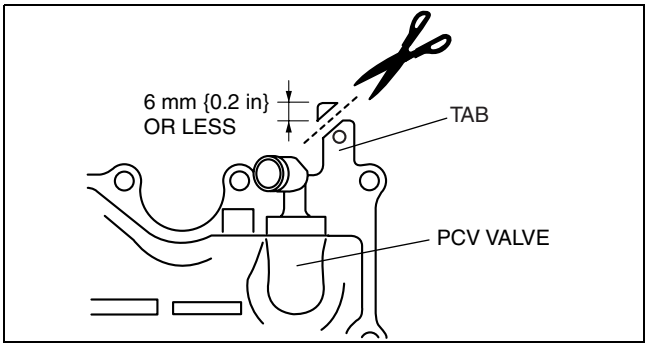
**Note**
- If fuel injector No.3 contacts the oil separator, cut the tab on the oil separator as shown in the figure. Carefully cut the tab so that the oil separator is not deformed or damaged, with no clearance on the mating surfaces of the oil separator and engine.

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2. Keep ratcheting the **SST** so that the fuel injector becomes free enough to ratchet up without using the **SST**.

**Caution**
- **Do not apply excessive force to the fuel injector connector because the fuel injector could be damaged.**

3. Pull out the fuel injector by ratcheting it upright.
4. Verify that there are no gasket in the cylinder heads after removing the fuel injectors.

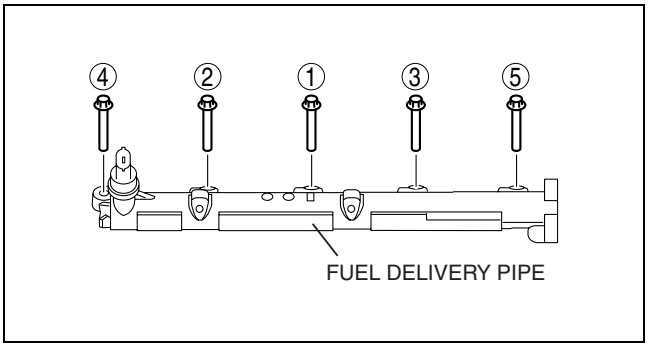
**Warning**
- **If foreign material such as metal shavings penetrates the fuel injector installation hole on the cylinder block, the engine could be damaged. Remove all foreign material and cap the fuel injector installation hole after removing the fuel injector.**

5. Clean the fuel injector and around the insertion hole using a vacuum cleaner.

**Fuel Delivery Pipe Installation Note**

1. Tighten the bolts in the order shown in the figure.

**Tightening torque**
**17— 23 N·m {1.8— 2.3 kgf·m, 13— 16 ft·lbf}**

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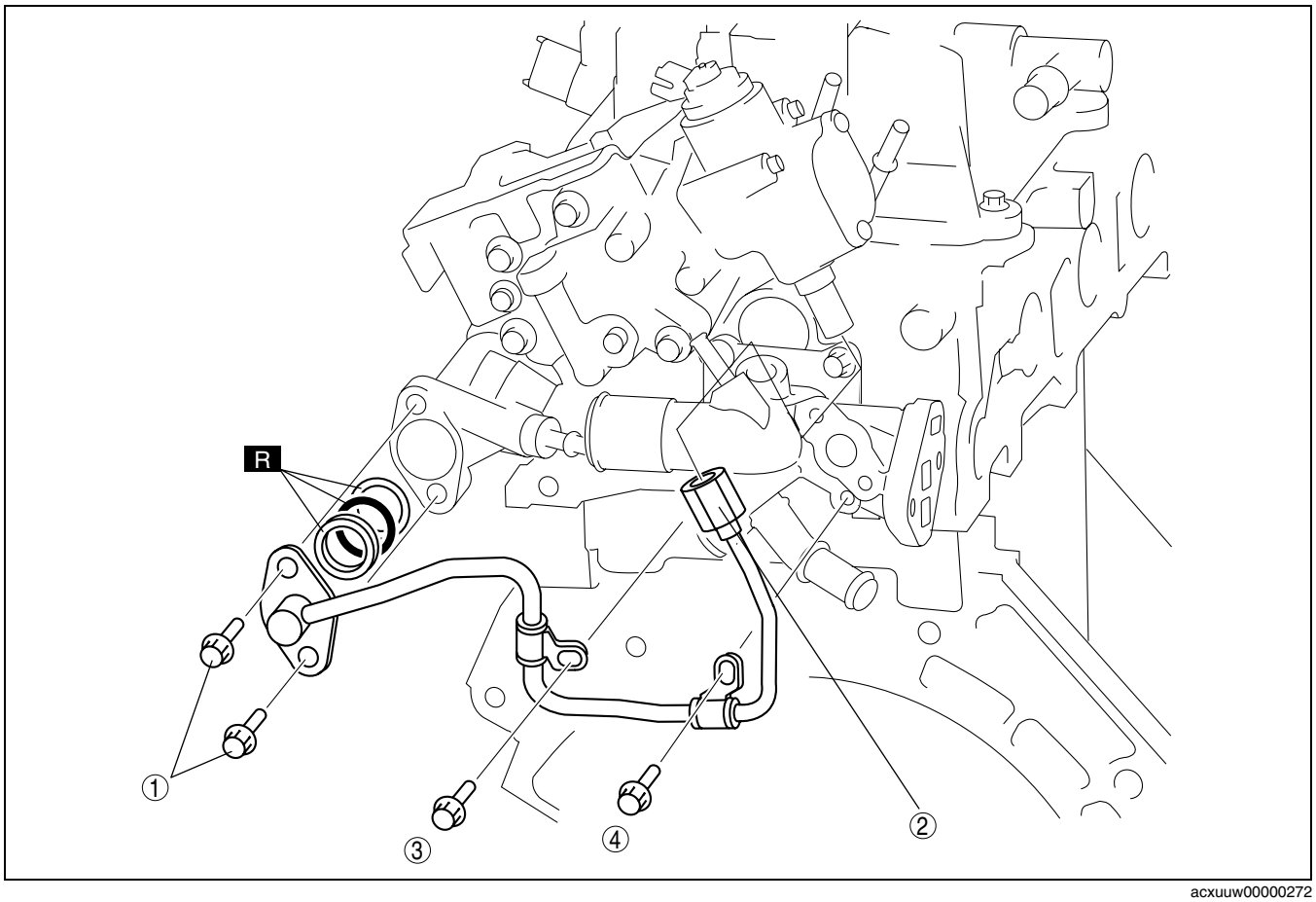
**High Pressure Line Pipe Installation Note**

1. Temporarily tighten the bolts in the order shown in the figure.

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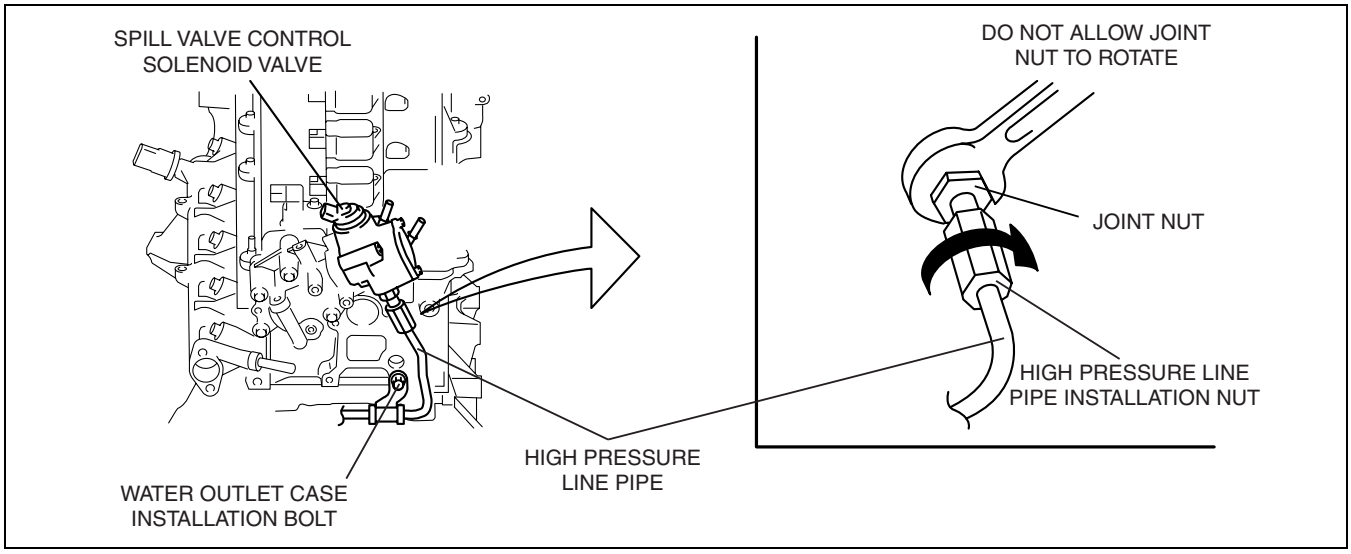
2. Tighten No.1 bolts shown in the figure.

**Tightening torque**
**17— 23 N·m {1.8— 2.3 kgf·m, 13— 16 ft·lbf}**

3. Tighten No.2 bolts shown in the figure.

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(1) Fix the joint nut with a wrench on the high pressure fuel pump side as shown in the figure.
(2) Tighten the high pressure line pipe installation nut.

**Tightening torque**
**23.5— 35.5 N·m {2.40— 3.61 kgf·m, 17.4— 26.1 ft·lbf}**

4. Tighten No.3, No.4 bolts shown in the figure.

**Tightening torque**
**17— 23 N·m {1.8— 2.3 kgf·m, 13— 16 ft·lbf}**

## FUEL INJECTOR INSPECTION[L3 WITH TC]

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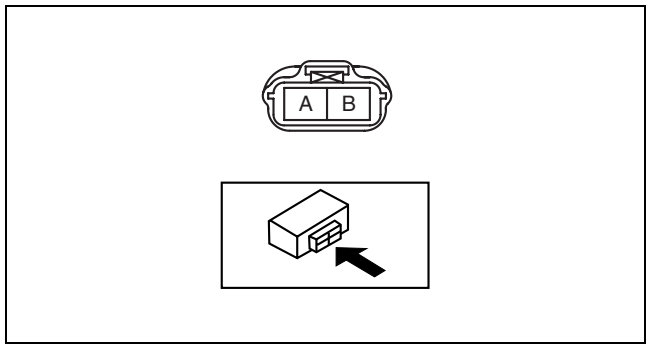
**Operation Test**

1. Carry out the “Fuel Injector Operation Inspection”. (See01-03-78 ENGINE CONTROL SYSTEM OPERATION INSPECTION[L3 WITH TC].)
   - If not as specified, perform the further inspection for the fuel injectors.

**Resistance Inspection**

**Note**
- Perform the following procedure only when directed.

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable.
3. Remove the fuel delivery pipe. (See 01-14-23 FUEL INJECTOR REMOVAL/INSTALLATION[L3 WITH TC].)
4. Disconnect the fuel injector connectors.
5. Measure the resistance of the fuel injector using a tester.
   - If not as specified, replace the fuel injector. (See01-14-23 FUEL INJECTOR REMOVAL/ INSTALLATION[L3 WITH TC].)
   - If as specified but “Operation Test” is failed, carry out the “Circuit Open/Short Inspection”. Inspect for open or short circuit.

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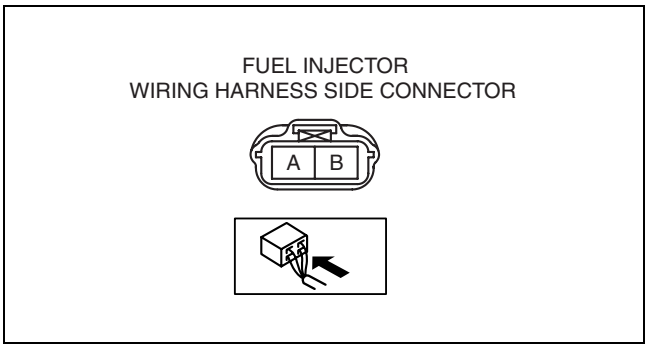
**Fuel injector resistance**
**1.0— 1.2 ohms [20 °C {68 °F}]**

**Circuit Open/Short Inspection**

1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit (continuity check).

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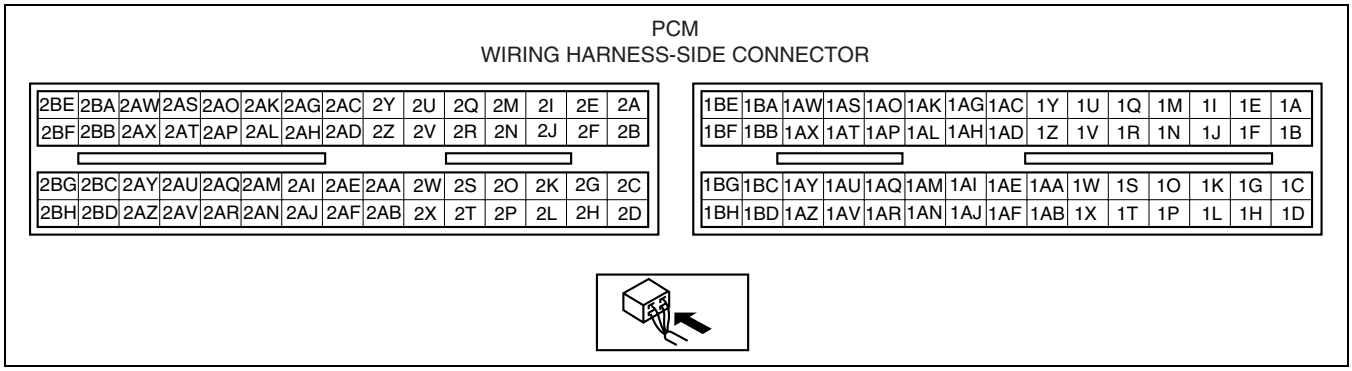


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**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — No.1 cylinder fuel injector terminal A and PCM terminal 2BB
  - — No.2 cylinder fuel injector terminal A and PCM terminal 2BC
  - — No.3 cylinder fuel injector terminal A and PCM terminal 2BD
  - — No.4 cylinder fuel injector terminal A and PCM terminal 2AZ
  - — No.1 cylinder fuel injector terminal B and PCM terminal 2BG
  - — No.2 cylinder fuel injector terminal B and PCM terminal 2BH
  - — No.3 cylinder fuel injector terminal B and PCM terminal 2BH
  - — No.4 cylinder fuel injector terminal B and PCM terminal 2BG

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — No.1 cylinder fuel injector terminal A and power supply
  - — No.1 cylinder fuel injector terminal A and body ground
  - — No.2 cylinder fuel injector terminal A and power supply
  - — No.2 cylinder fuel injector terminal A and body ground
  - — No.3 cylinder fuel injector terminal A and power supply
  - — No.3 cylinder fuel injector terminal A and body ground
  - — No.4 cylinder fuel injector terminal A and power supply
  - — No.4 cylinder fuel injector terminal A and body ground
  - — No.1 cylinder fuel injector terminal B and power supply
  - — No.1 cylinder fuel injector terminal B and body ground
  - — No.2 cylinder fuel injector terminal B and power supply
  - — No.2 cylinder fuel injector terminal B and body ground
  - — No.3 cylinder fuel injector terminal B and power supply
  - — No.3 cylinder fuel injector terminal B and body ground
  - — No.4 cylinder fuel injector terminal B and power supply
  - — No.4 cylinder fuel injector terminal B and body ground

**PRESSURE REGULATOR INSPECTION[L3 WITH TC]**

id011439800800

**Note**

- Due to the adoption of the mechanical returnless fuel system, the pressure regulator cannot be inspected separately.

1. Perform “FUEL LINE PRESSURE INSPECTION”. (See 01-14-5 FUEL LINE PRESSURE INSPECTION[L3 WITH TC].)

# 01-15 EXHAUST SYSTEM [L3 WITH TC]

**EXHAUST SYSTEM INSPECTION [L3 WITH TC] . . . . . 01-15–1**
**EXHAUST SYSTEM REMOVAL/INSTALLATION [L3 WITH TC] . . . . . 01-15–2**
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HO2S Removal Note . . . . . **01-15–3**
Exhaust Manifold Insulator (Upper) Removal Note . . . . . **01-15–3**
WU-TWC Removal Note . . . . . **01-15–3**
Exhaust Manifold Installation Note . . . . . **01-15–4**
WU-TWC Installation Note . . . . . **01-15–4**
Seal Ring Installation Note . . . . . **01-15–4**



## EXHAUST SYSTEM INSPECTION[L3 WITH TC]

id011539800100

1. Start the engine and inspect each exhaust system component for exhaust gas leakage.
   - If there is leakage, repair or replace if necessary.

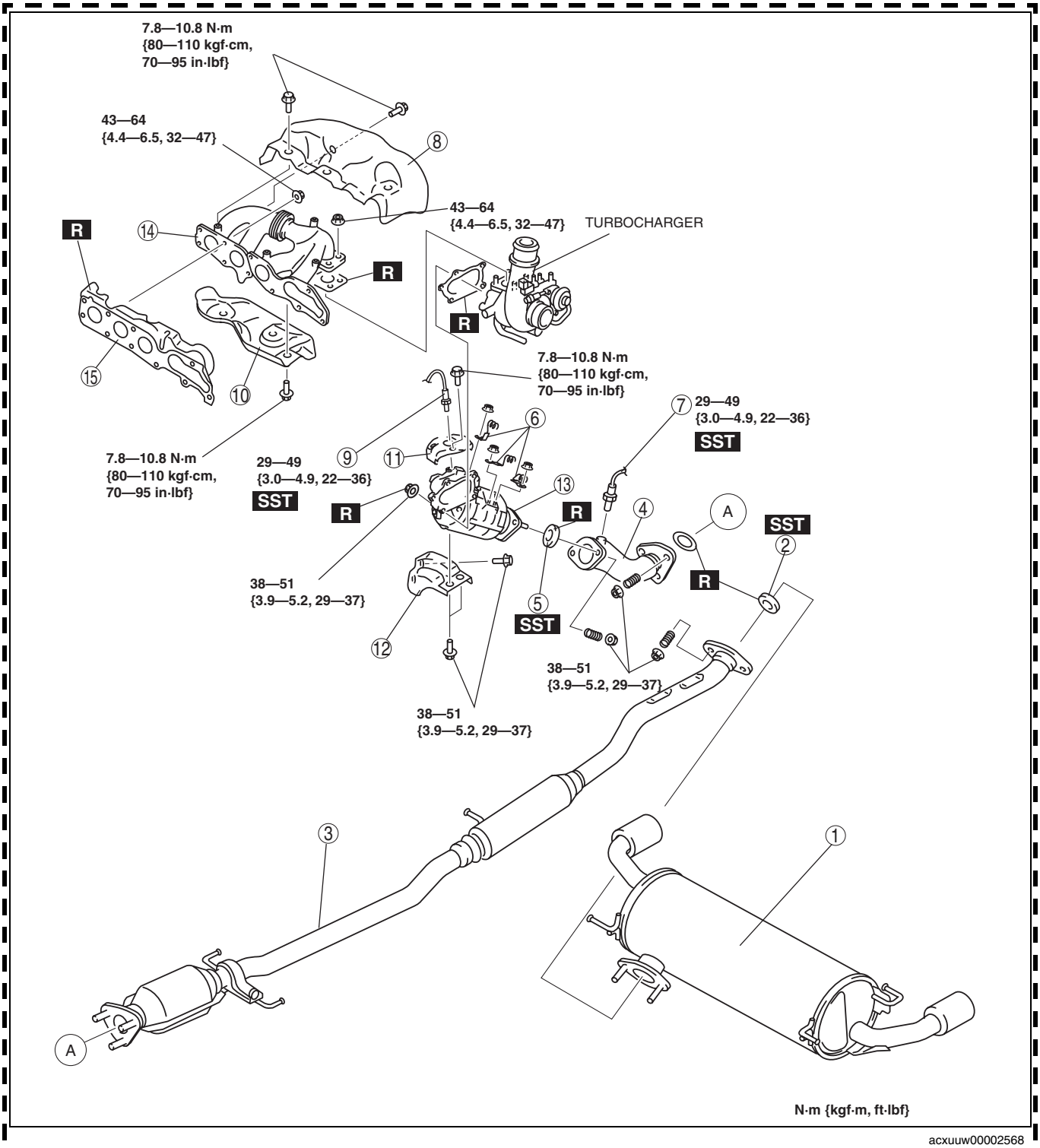
## EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC]

id011539800200

**Warning**

- **A hot engine and exhaust system can cause severe burns. Turn off the engine and wait until they are cool before removing the exhaust system.**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct.
3. Remove the charge air cooler cover. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
4. Remove the charge air cooler. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

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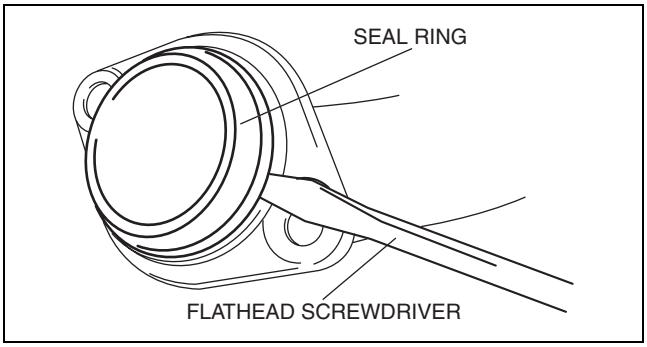
| | |
|---|---|
| 1 | Main silencer |
| 2 | Seal ring (middle pipe side)<br>(See 01-15-3 Seal Ring Removal Note.)<br>(See 01-15-4 Seal Ring Installation Note.) |
| 3 | Middle pipe |
| 4 | Front pipe |
| 5 | Seal ring (WU-TWC side)<br>(See 01-15-3 Seal Ring Removal Note.)<br>(See 01-15-4 Seal Ring Installation Note.) |
| 6 | Clip |
| 7 | Rear HO2S<br>(See 01-15-3 HO2S Removal Note.) |
| 8 | Exhaust manifold insulator (Upper)<br>(See 01-15-3 Exhaust Manifold Insulator (Upper) Removal Note.) |
| 9 | Front HO2S<br>(See01-15-3 HO2S Removal Note.) |
| 10 | Exhaust manifold insulator (Lower) |
| 11 | WU-TWC insulator |
| 12 | WU-TWC bracket |
| 13 | WU-TWC<br>(See 01-15-3 WU-TWC Removal Note.)<br>(See 01-15-4 WU-TWC Installation Note.) |
| 14 | Exhaust manifold<br>(See 01-15-4 Exhaust Manifold Installation Note.) |
| 15 | Exhaust manifold gasket |



**Seal Ring Removal Note**

1. Remove the seal ring using a flathead screwdriver being careful not to damage the pipe.

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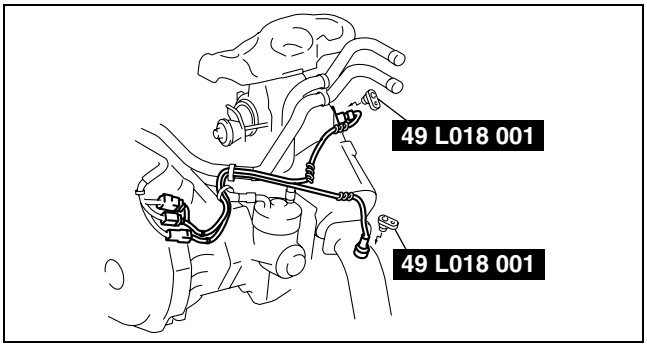
**HO2S Removal Note**

1. Remove the HO2S using the **SST** before removing the exhaust manifold.

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**Exhaust Manifold Insulator (Upper) Removal Note**

1. Remove the charge air cooler bracket.
2. Remove the exhaust manifold insulator (upper)

**WU-TWC Removal Note**

**2WD**

1. Remove the generator duct. (See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC])
2. Remove the WU-TWC.

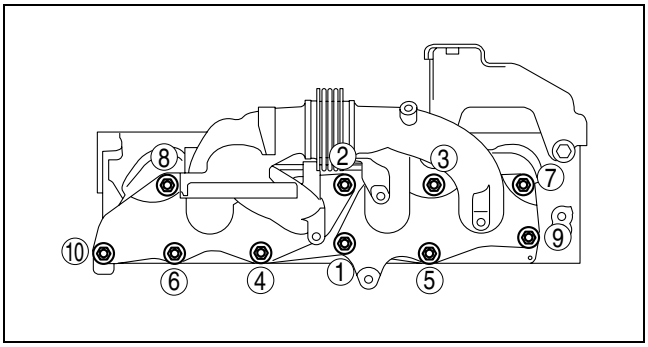
**4WD**

1. Remove the cowl grille.
2. Remove the windshield wiper motor.
3. Remove the cowl panel. (See 09-10-13 COWL PANEL REMOVAL/INSTALLATION)
4. Remove the generator duct. (See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC])
5. Set the generator out of the way.
6. Remove the WU-TWC.

**Exhaust Manifold Installation Note**

1. Tighten the exhaust manifold installation nuts in the order shown.

   **Tightening torque**
   **43— 64 N·m {4.4— 6.5 kgf·m, 32— 47 ft·lbf}**

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**WU-TWC Installation Note**

1. Temporarily tighten No.1 shown in the figure.
2. Temporarily tighten No.2 shown in the figure.
3. Temporarily tighten No.3 shown in the figure.
4. Completely tighten No.1 shown in the figure.

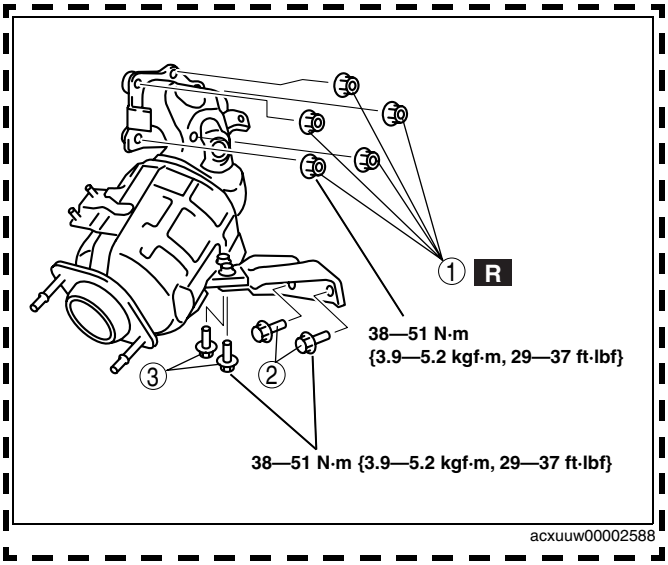
   **Tightening torque**
   **38— 51 N·m {3.9— 5.2 kgf·m, 29— 37 ft·lbf}**

5. Completely tighten No.2 shown in the figure.

   **Tightening torque**
   **38— 51 N·m {3.9— 5.2 kgf·m, 29— 37 ft·lbf}**

6. Completely tighten No.3 shown in the figure.

   **Tightening torque**
   **38— 51 N·m {3.9— 5.2 kgf·m, 29— 37 ft·lbf}**

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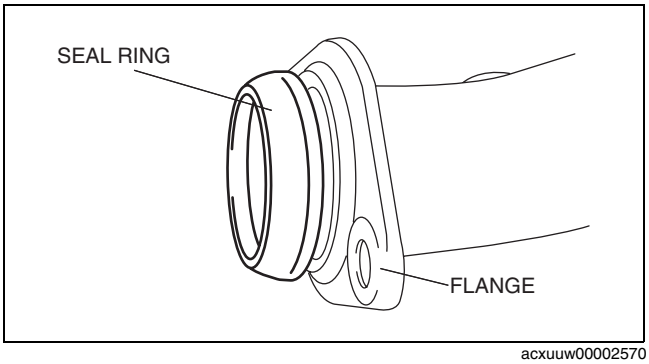
**Seal Ring Installation Note**

**Caution**
- **If installation is performed without using the SST, the seal ring will be damaged and deformed, resulting in an incorrect installation. Always use the SST to install the seal ring.**

1. Temporarily install the seal ring to the pipe so that the seal ring is even with the flange.

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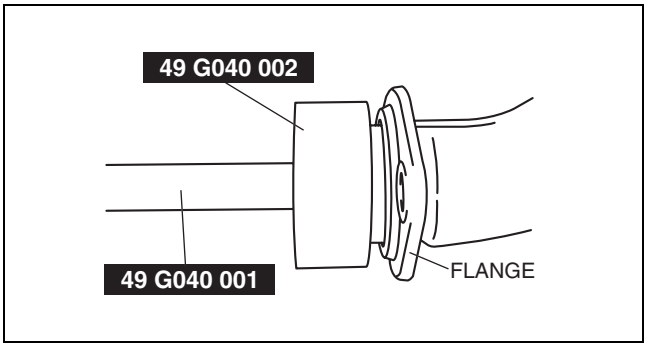
2. Install the **SST** to the seal ring so that the **SST** is even with the flange.

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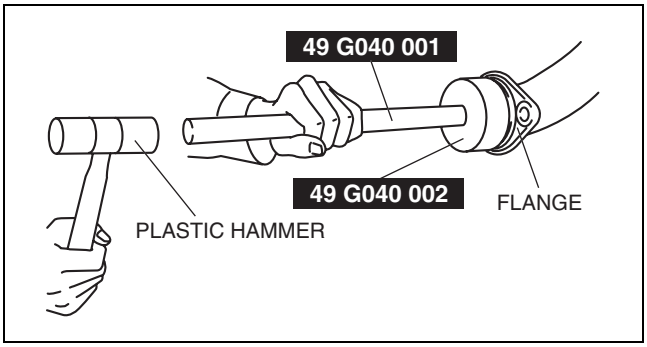
3. Press in the seal ring by tapping the **SST** using a plastic hammer until the seal ring contacts the flange.

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# 01-16 EMISSION SYSTEM [L3 WITH TC]

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**CHARCOAL CANISTER REMOVAL/INSTALLATION [L3 WITH TC] ..... 01-16–6**
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## EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM LOCATION INDEX[L3 WITH TC]

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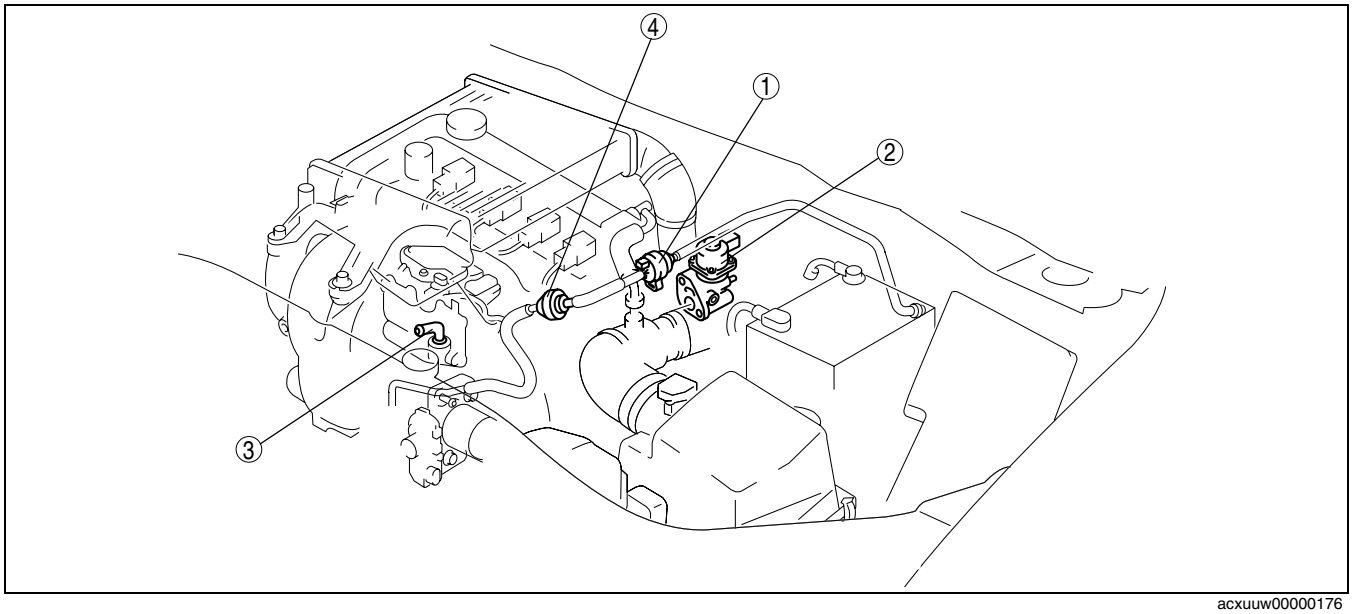
### Engine Compartment Side

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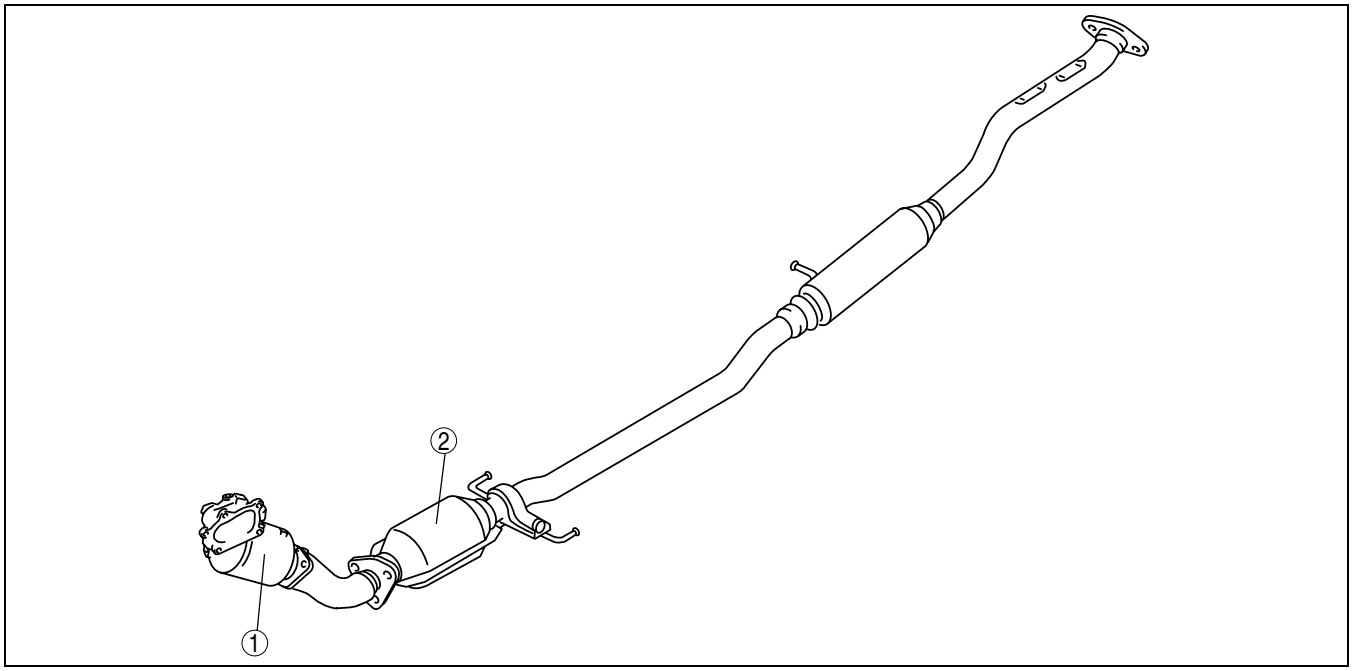
| | |
|---|---|
| 1 | Purge solenoid valve<br>(See 01-16-9 PURGE SOLENOID VALVE REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 01-16-9 PURGE SOLENOID VALVE INSPECTION[L3 WITH TC]) |
| 2 | EGR valve<br>(See 01-16-11 EGR VALVE REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-16-12 EGR VALVE INSPECTION[L3 WITH TC].) |
| 3 | PCV valve<br>(See 01-16-14 POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION[L3 WITH TC].) |
| 4 | Check valve<br>(See 01-16-11 CHECK VALVE INSPECTION[L3 WITH TC].) |

### Exhaust system side

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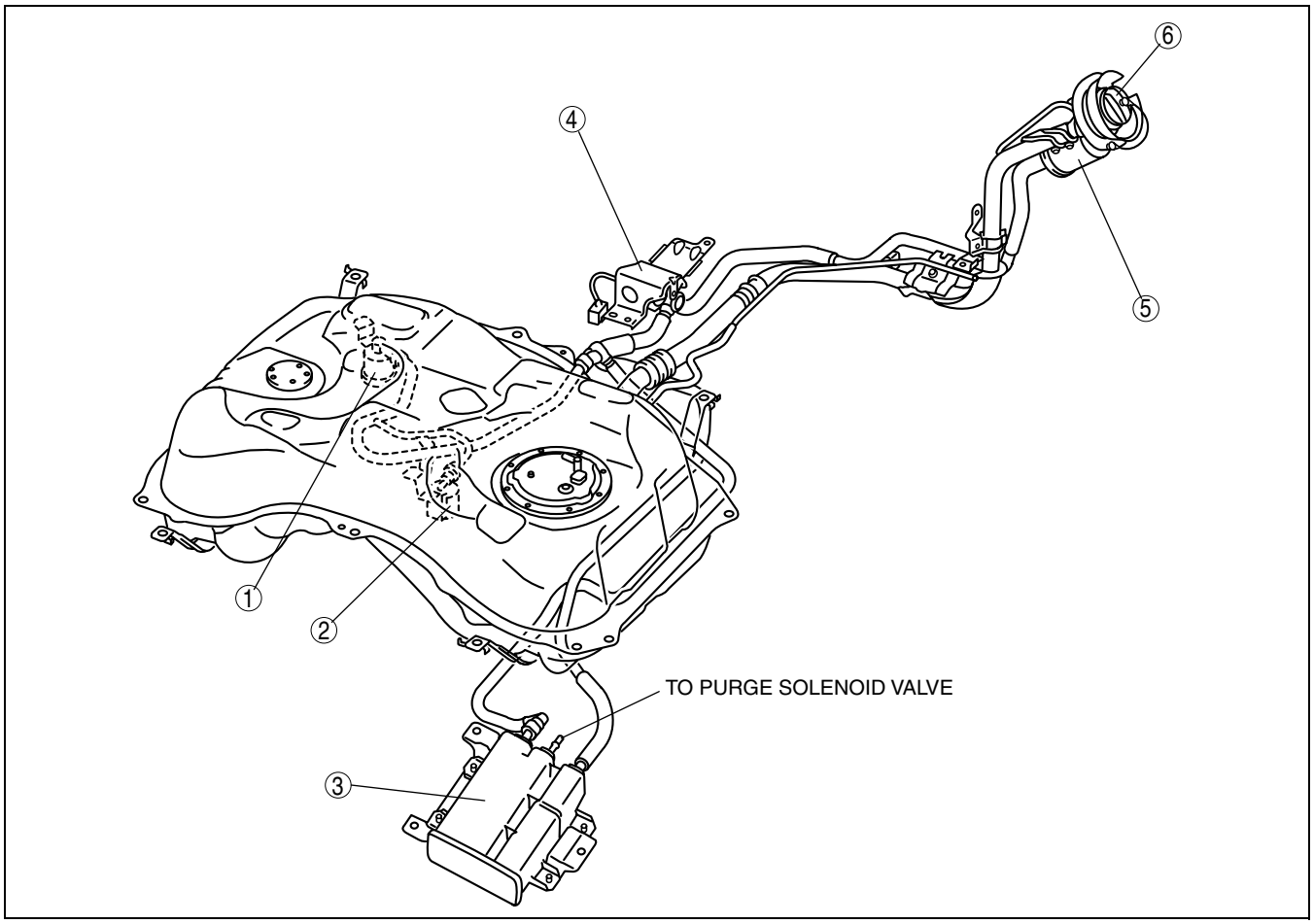
| | |
|---|---|
| 1 | WU-TWC |
| 2 | TWC |

**Fuel Tank Side**

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| | |
|---|---|
| 1 | Fuel shut-off valve |
| 2 | Rollover valve |
| 3 | Charcoal canister<br>(See 01-16-6 CHARCOAL CANISTER REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-16-6 CHARCOAL CANISTER INSPECTION[L3 WITH TC].) |

| | |
|---|---|
| 4 | EVAP system leak detection pump<br>(See 01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION[L3 WITH TC].) |
| 5 | Air filter<br>(See 01-16-5 AIR FILTER INSPECTION[L3 WITH TC].) |
| 6 | Fuel filler cap<br>(See 01-16-4 FUEL-FILLER CAP INSPECTION[L3 WITH TC].) |

## EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM DIAGRAM[L3 WITH TC]

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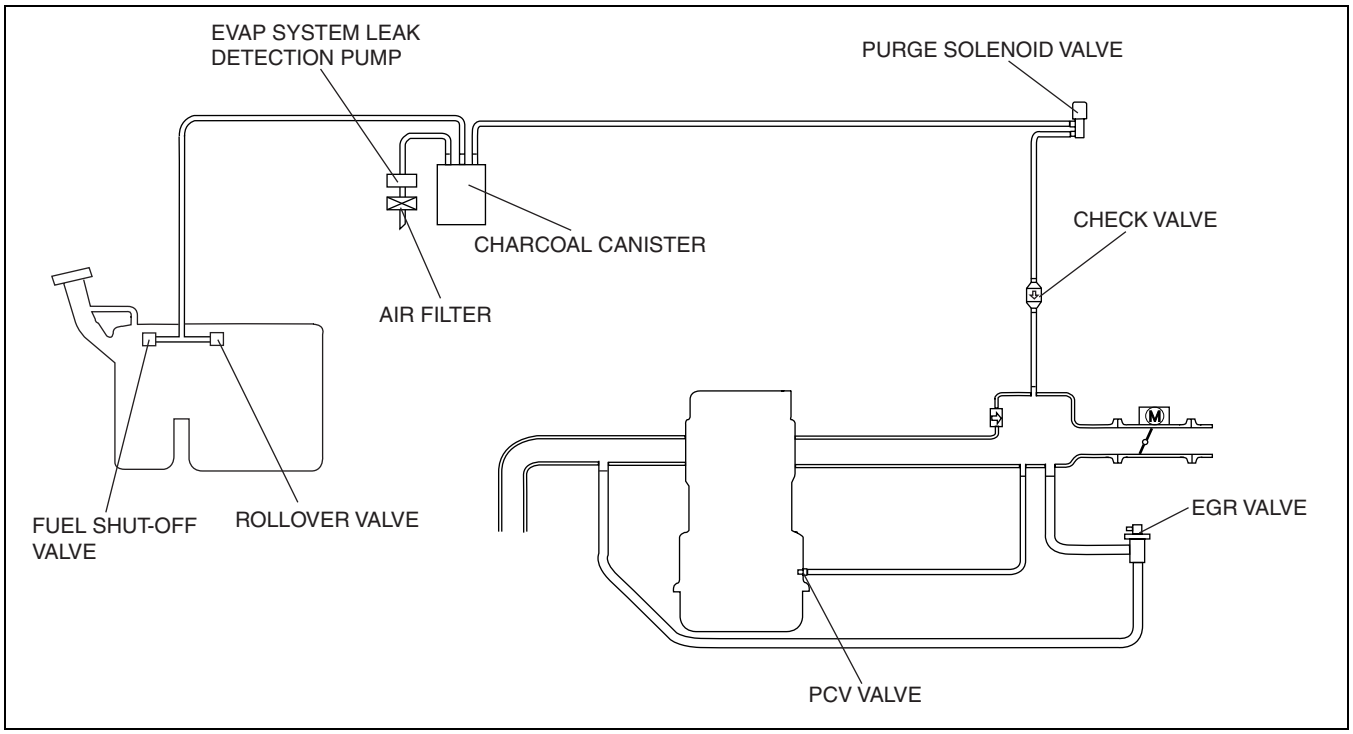


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## FUEL-FILLER CAP INSPECTION[L3 WITH TC]

id011639801300

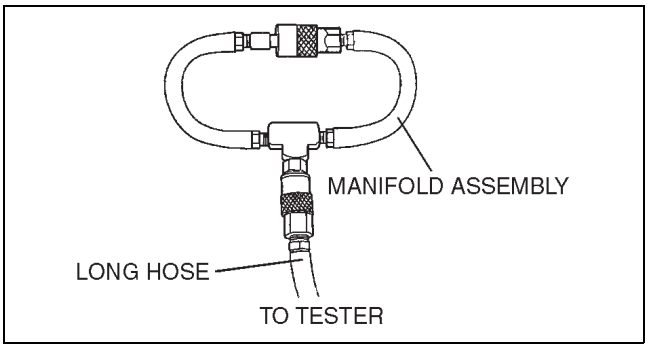
**Leakage Inspection**

1. Perform the following **SST** (Evaporative Emission System Tester 134-01049) self-test:

**Note**
- If the tester does not work correctly during self-test, refer to the tester operators manual for more detailed procedures.

(1) Verify that the gas cylinder valve is closed and the control valve located on the tester is in the TEST position. All tester displays should be off at this time.
(2) Connect the long hose (part of **SST**) to the tester.
(3) Connect the manifold assembly (part of **SST**) to the long hose as shown.
(4) Open the gas cylinder valve and verify the gas cylinder regulator left gauge reads **69— 82 kPa {0.71— 0.83 kgf/cm$^2$, 10— 12 psi}** (preset at factory).
- If not, refer to the tester operators manual to contact tester manufacturer.

(5) Press the ON/OFF switch to turn on the **SST** and make sure the left display reads **0.0**.
(6) Turn the control valve on the tester to the FILL position.

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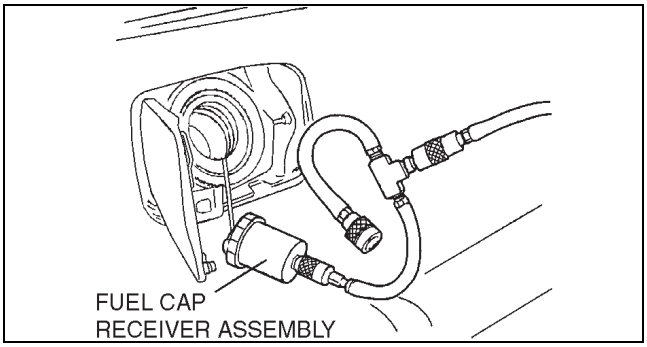
(7) Verify the left display reading is **within 13.9** to **14.0** in of water.
- If not, adjust the pressure using the regulator knob located on the right side of the tester.

(8) Turn the control valve to TEST position and press the START switch.
(9) After the **2-min** countdown (left display) is completed, the right display shows the total pressure loss for that period. A **0.5** in of water loss is acceptable on the self-test.
- If the loss is **more than 0.5** in of water, do one or more self-test. If the failed test repeats, check for leak using the ultrasonic leak detector (part of **SST**).

2. Press the RESET switch to set the left display reading to **0.0.**

3. Connect the fuel cap receiver assembly (part of SST) to the manifold assembly and fuel-filler cap from the vehicle.
   - If the fuel-filler cap is not a genuine part, replace it.
4. Turn the control valve to the FILL position.
5. Wait (**maximum 20 s**) until the left display reads **13.9** to **14.0** in of water.
   - If the reading is slightly below the specification, adjust it using the regulator knob.
   - If the reading is far below, the fuel-filler cap has leak. Replace it.

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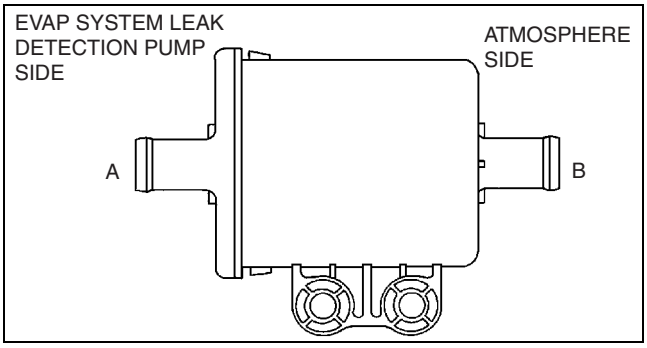
6. Turn the control valve to the TEST position and press the START switch.
7. After the **2-min** countdown (left display) is completed, check the test result (the failed/passed light on the tester).
   - If the green light turns on, the fuel-filler cap is normal.
   - If the red light turns on, the fuel-filler cap has leakage. Replace it.
8. Close the gas cylinder valve.
9. Turn the control valve to the FILL position.
10. Press the ON/OFF switch to turn off the tester.

### AIR FILTER INSPECTION[L3 WITH TC]

id011639800600

1. Remove the air filter.
2. Blow from port A and verify that there is airflow from port B.
   - If not as specified, replace the air filter.
3. Blow from port B and verify that there is airflow from port A.
   - If not as specified, replace the air filter.

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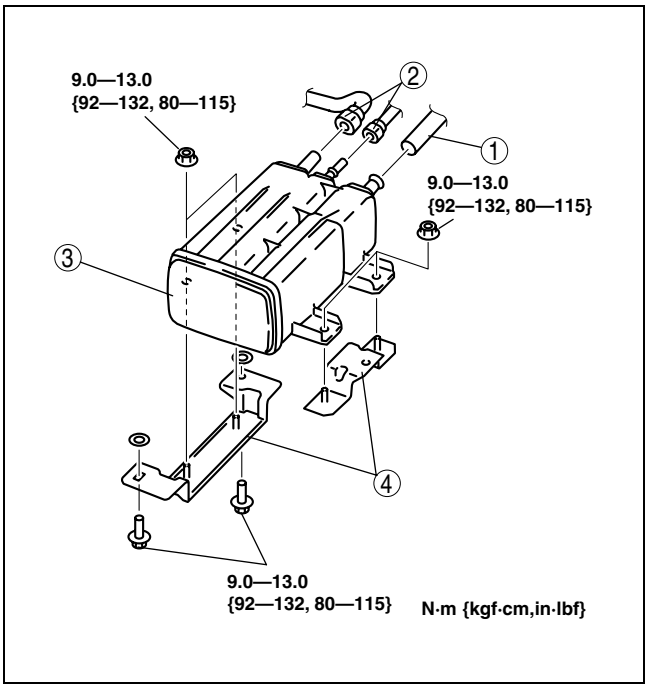
## CHARCOAL CANISTER REMOVAL/INSTALLATION[L3 WITH TC]

id011639801500

1. Remove the under cover (LR).
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Evaporative hose |
| 2 | Quick release connector (See 01-14-19 QUICK RELEASE CONNECTOR REMOVAL/INSTALLATION[L3 WITH TC]) |
| 3 | Charcoal canister |
| 4 | Charcoal canister bracket |

3. Install in the reverse order of removal.

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## CHARCOAL CANISTER INSPECTION[L3 WITH TC]

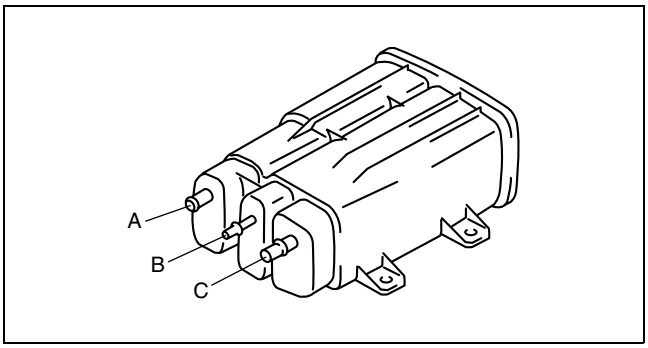
id011639800500

1. Remove the charcoal canister. (See01-16-6 CHARCOAL CANISTER REMOVAL/INSTALLATION[L3 WITH TC].)
2. Plug ports A and C, then blow air into port B.

**Caution**

- **Do not apply the pressure more than 20 kPa {0.2 kgf/cm$^2$, 2.9 psi} to the charcoal canister. Doing so will damage the charcoal canister.**

3. Verify that there is no air leakage from the case.
   - If not as specified, replace the charcoal canister. (See01-16-6 CHARCOAL CANISTER REMOVAL/INSTALLATION[L3 WITH TC].)

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## EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION[L3 WITH TC]

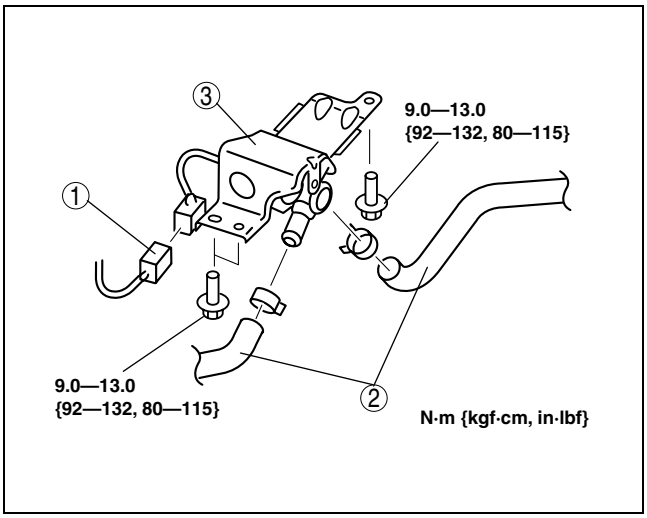
id011639800700

**2WD**

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Evaporative hose |
| 3 | EVAP system leak detection pump |

3. Install in the reverse order of removal.

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**AWD**

1. Disconnect the negative battery cable.

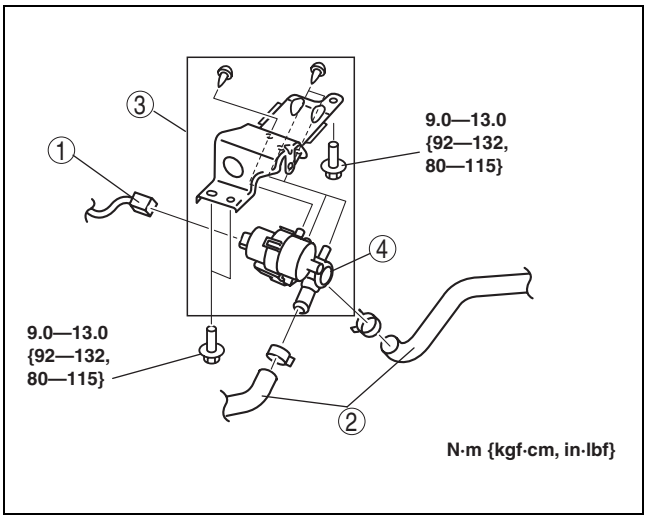
**Note**

- Because the AWD EVAP system leak detection pump is installed surrounded by the rear differential, there is insufficient space for removing the pump from the vehicle. Therefore, it is necessary to remove the EVAP system leak detection pump and bracket separately from the vehicle.

2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Evaporative hose |
| 3 | EVAP system leak detection pump and bracket (See 01-16-8 EVAP system leak detection pump and bracket removal note) |
| 4 | EVAP system leak detection pump (See 01-16-8 EVAP system leak detection pump and bracket removal note) |

3. Install in the reverse order of removal.

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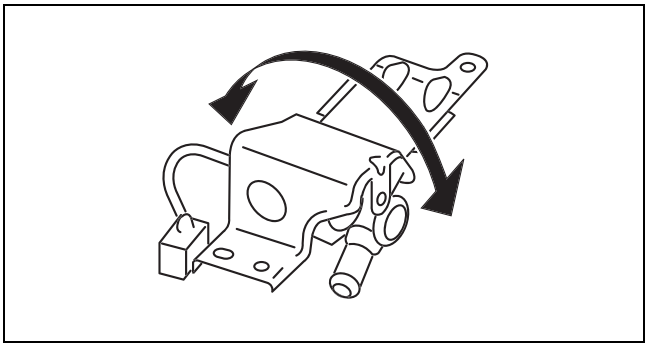
**EVAP system leak detection pump and bracket removal note**

**Note**
- Because the AWD EVAP system leak detection pump is installed surrounded by the rear differential, there is insufficient space for removing the pump from the vehicle. Therefore, it is necessary to remove the EVAP system leak detection pump and bracket separately from the vehicle.

1. Reverse the EVAP system leak detection pump and bracket.



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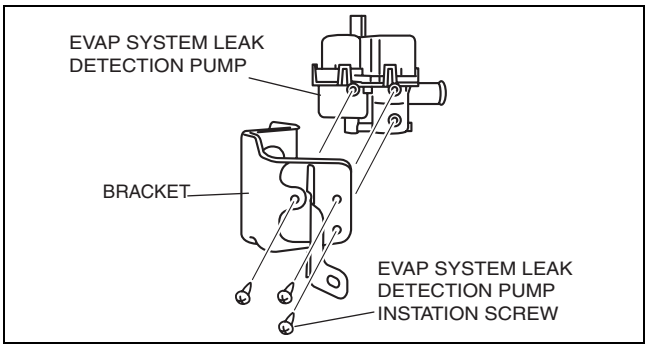
2. Remove the installation screws from the EVAP system leak detection pump.
3. Remove the EVAP system leak detection pump.
4. Remove the EVAP system leak detection pump bracket.

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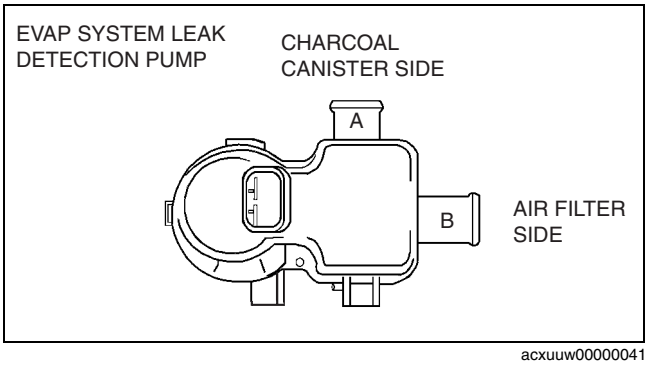
## EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP INSPECTION[L3 WITH TC]

id011639800800

### Airflow Inspection

**Note**
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the EVAP system leak detection pump. (See01-16-7 EVAPORATIVE EMISSION (EVAP) SYSTEM LEAK DETECTION PUMP REMOVAL/INSTALLATION[L3 WITH TC].)
3. Blow air into port A and verify that there is airflow from port B.
   - If not as specified, replace the EVAP system leak detection pump.
4. Blow air into port B and verify that there is airflow from port A.
   - If not as specified, replace the EVAP system leak detection pump.
   - If as specified, perform the following “Resistance Inspection”.



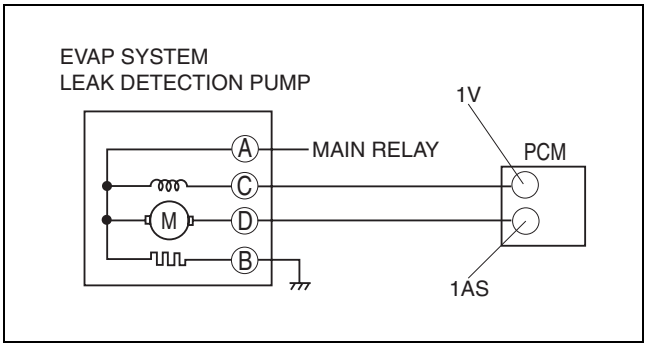

acxuuw00000041

**Resistance Inspection**

**Note**
- Perform the following procedure only when directed.

1. Disconnect the negative battery cable.
2. Inspect resistance of the EVAP system leak detection pump.
   - If not as specified, replace the EVAP system leak detection pump.
   - If as specified, carry out the “Circuit Open/ Short Inspection”.

| Terminals | Resistance (ohm) |
|---|---|
| A— B | 20— 50 |
| A— C | 26.6— 32.4 |
| A— D | MAX. 118 |

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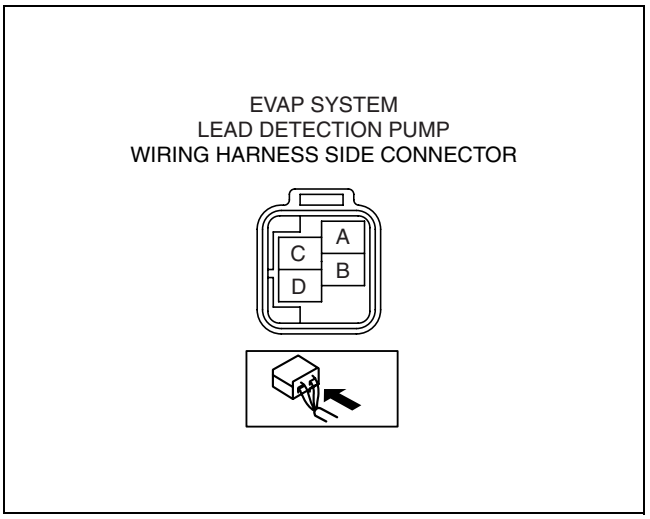
**Circuit Open/Short Inspection**

1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit (continuity check).

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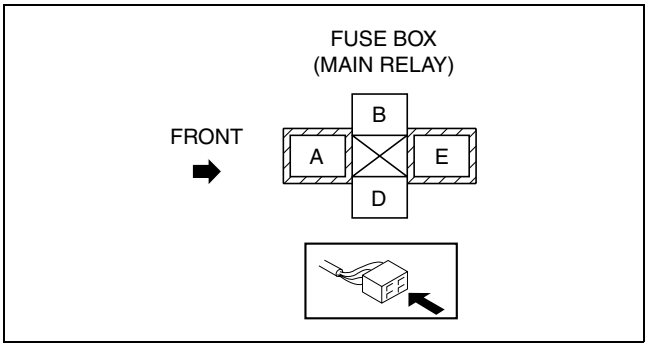


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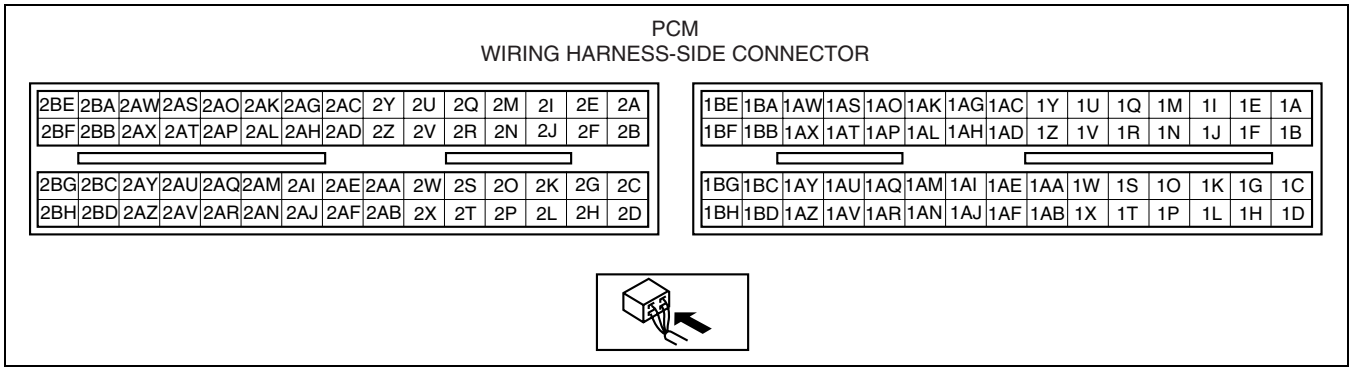


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**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — EVAP system leak detection pump terminal A and main relay terminal E
  - — EVAP system leak detection pump terminal B and the body ground
  - — EVAP system leak detection pump terminal C and PCM terminal 1V
  - — EVAP system leak detection pump terminal D and PCM terminal 1AS

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — EVAP system leak detection pump terminal A and body ground
  - — EVAP system leak detection pump terminal B and power supply
  - — EVAP system leak detection pump terminal C and power supply
  - — EVAP system leak detection pump terminal C and body ground
  - — EVAP system leak detection pump terminal D and power supply
  - — EVAP system leak detection pump terminal D and body ground

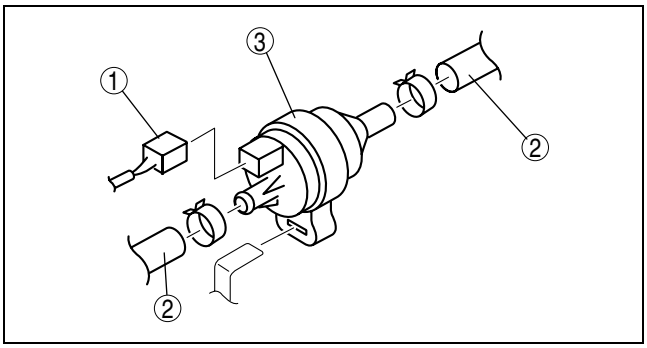
## PURGE SOLENOID VALVE REMOVAL/INSTALLATION[L3 WITH TC]

id011639803500

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct.
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Vacuum hose |
| 3 | Purge solenoid valve |

4. Install in the reverse order of removal.

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## PURGE SOLENOID VALVE INSPECTION[L3 WITH TC]

id011639800900

### Airflow Inspection

**Note**
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Remove the purge solenoid valve. (See 01-16-9 PURGE SOLENOID VALVE REMOVAL/INSTALLATION[L3 WITH TC].)
3. Inspect airflow between the ports under the following conditions.
   - If not as specified, replace the purge solenoid valve. (See 01-16-9 PURGE SOLENOID VALVE REMOVAL/INSTALLATION[L3 WITH TC].)
   - If as specified, carry out the “Circuit Open/Short Inspection”.

○—○ : Continuity ○═○ : Airflow

| Step | Terminal | | Port | |
|---|---|---|---|---|
| | A | B | A | B |
| 1 | ○—○ | | | |
| 2 | B+ | GND | ○═○ | |

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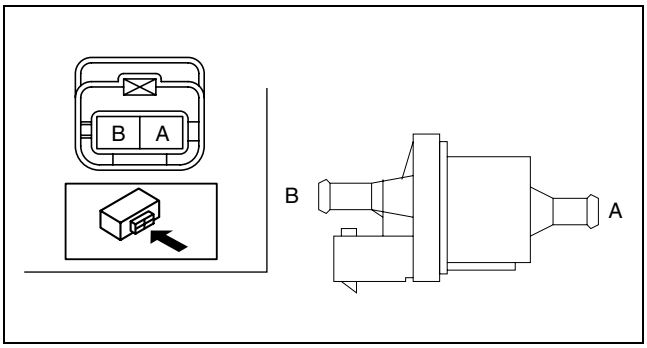


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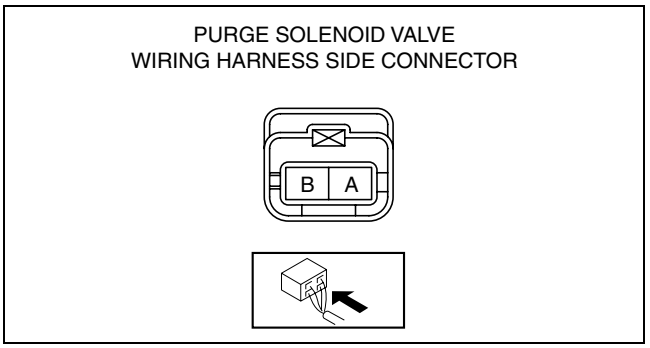
**Circuit Open/Short Inspection**

1. Disconnect the PCM connector. (See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit (continuity check).

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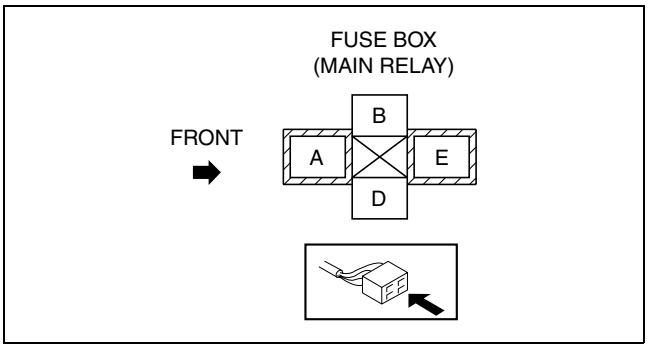


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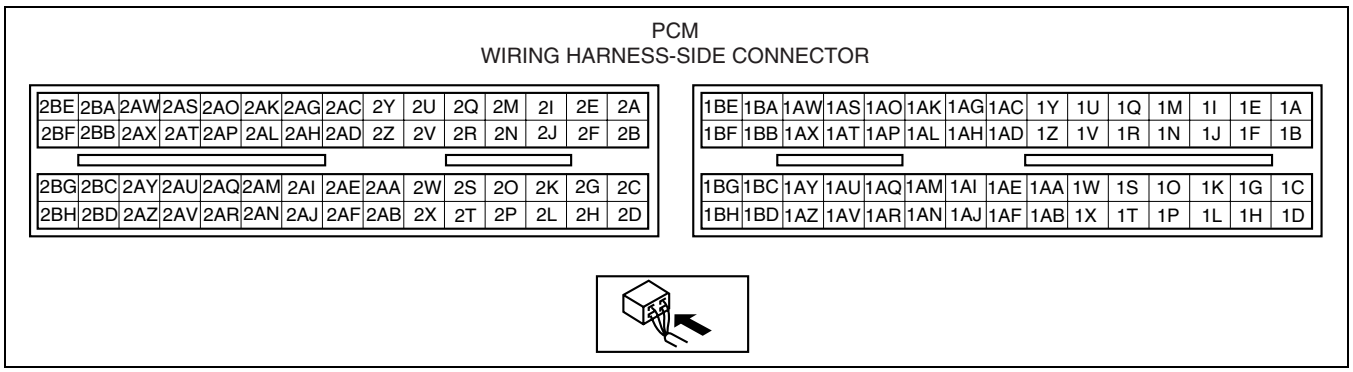


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**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Purge solenoid valve terminal A and main relay terminal E
  - — Purge solenoid valve terminal B and PCM terminal 2AB

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Purge solenoid valve terminal A and body ground
  - — Purge solenoid valve terminal B and power supply
  - — Purge solenoid valve terminal B and body ground

### CHECK VALVE INSPECTION[L3 WITH TC]

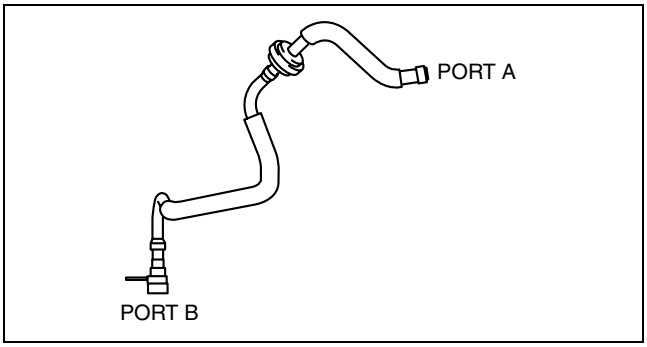
id011639801400

1. Remove the charge air cooler duct.
2. Disconnect the vacuum hose connected between the check valve and the purge solenoid valve from the purge solenoid valve.
3. Disconnect the vacuum hose connected between the check valve and the intake manifold from the intake manifold.
4. Blow through the check valve and verify that air flows as specified.
   - If not as specified, replace the check valve.

**Specification**

| Condition | Airflow |
|---|---|
| Air applied from port A to B | Yes |
| Air applied from port B to A | No* |

* : The check valve is normal if the aeration to port B is **3.5 kPa/min {0.03 kgf/cm2 min, 0.5 psi/min} or less** when **130 kPa {1.32 kgf/cm2, 18.9 psi}** is applied to port A.

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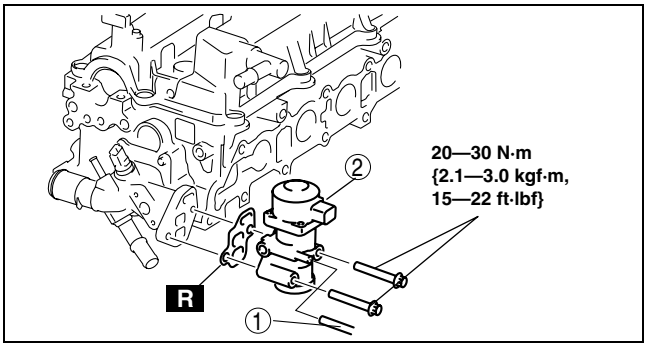
### EGR VALVE REMOVAL/INSTALLATION[L3 WITH TC]

id011639801000

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct.
3. Disconnect the EGR valve connector.
4. Remove the air hose and air duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
5. Drain the engine coolant. (See01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.

| | |
|---|---|
| 1 | Water hose |
| 2 | EGR valve |

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## EGR VALVE INSPECTION[L3 WITH TC]

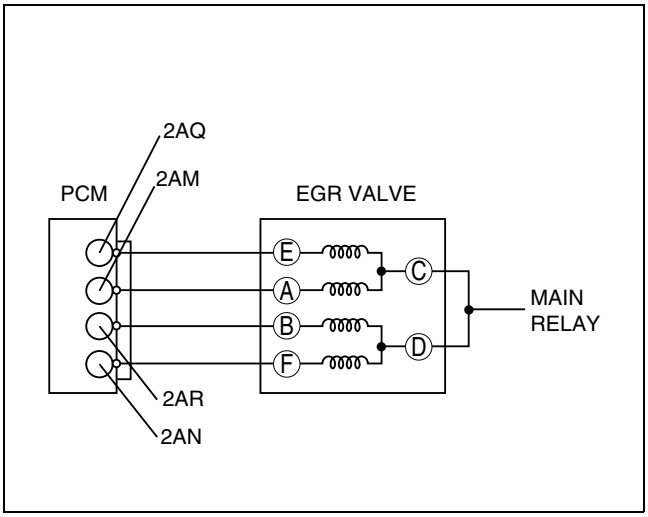
id011639801100

### Resistance Inspection

**Note**
- Perform the following test only when directed.

1. Disconnect the negative battery cable.
2. Inspect resistance of the EGR valve coils.
   - If not as specified, replace the EGR valve. (See 01-16-11 EGR VALVE REMOVAL/ INSTALLATION[L3 WITH TC])
   - If as specified, carry out the “Circuit Open/ Short Inspection”.

| Terminals | Resistance (ohm) |
|---|---|
| C— E<br>C— A<br>D— B<br>D— F | 8— 9 |

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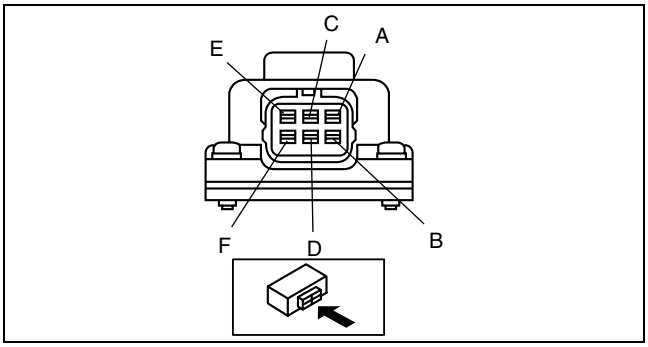


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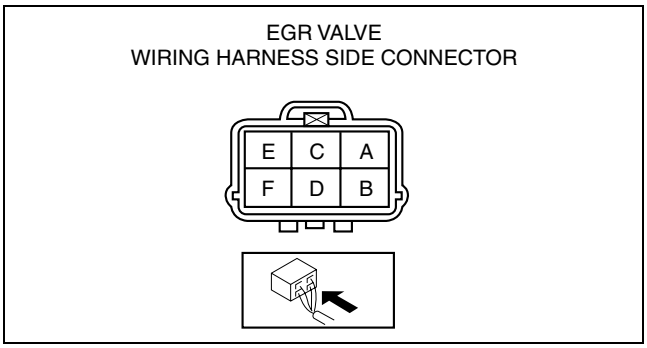
**Circuit Open/Short Inspection**

1. Disconnect the PCM connector. (See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for open or short circuit (continuity check).

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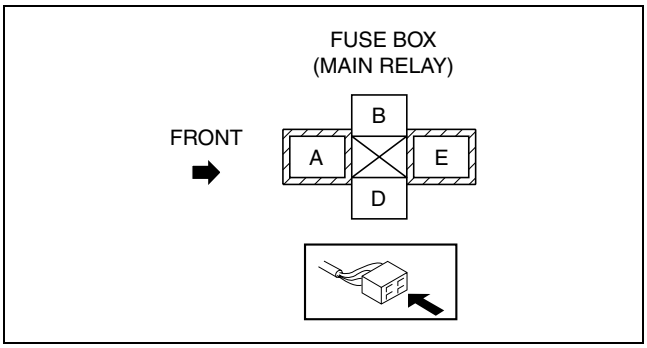


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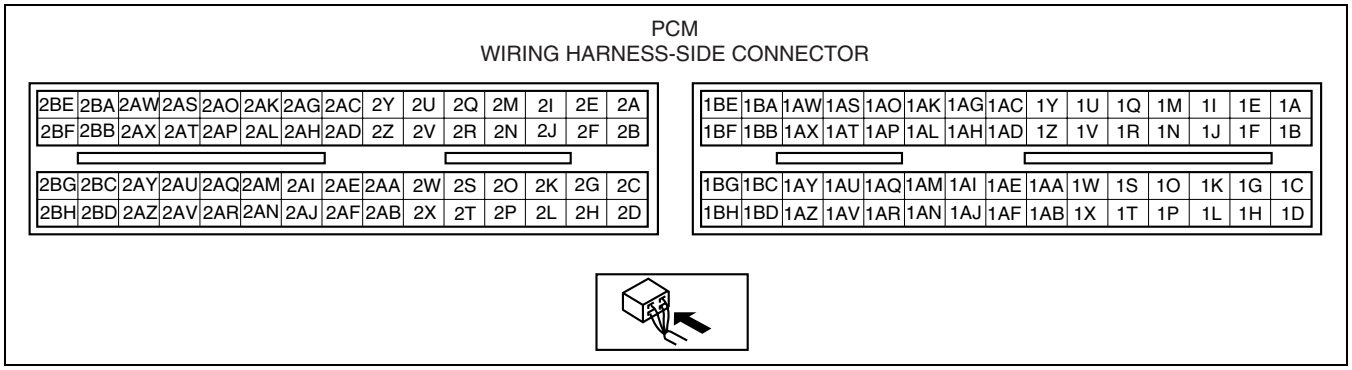


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**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — EGR valve terminal A and PCM terminal 2AM
  - — EGR valve terminal B and PCM terminal 2AR
  - — EGR valve terminal C or D and main relay terminal E
  - — EGR valve terminal E and PCM terminal 2AQ
  - — EGR valve terminal F and PCM terminal 2AN

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — EGR valve terminal A and power supply
  - — EGR valve terminal A and body ground
  - — EGR valve terminal B and power supply
  - — EGR valve terminal B and body ground
  - — EGR valve terminal C or D and body ground
  - — EGR valve terminal E and power supply
  - — EGR valve terminal E and body ground
  - — EGR valve terminal F and power supply
  - — EGR valve terminal F and body ground

3. Remove the EGR valve, and inspect for any damage or clogging.
   - If there is no damage or clogging, replace the EGR valve. (See 01-16-11 EGR VALVE REMOVAL/INSTALLATION[L3 WITH TC])

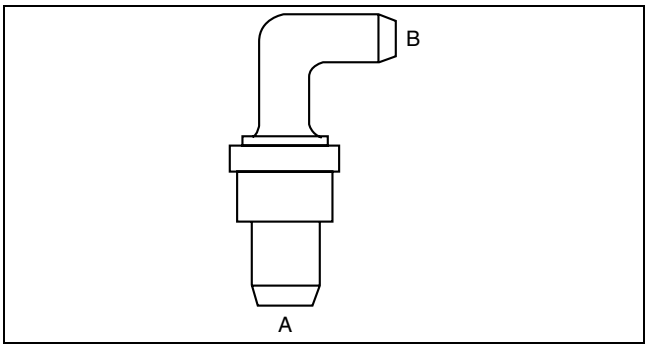
### POSITIVE CRANKCASE VENTILATION (PCV) VALVE INSPECTION[L3 WITH TC]

id011639800400

1. Remove the intake manifold. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
2. Remove the PCV valve.
3. Blow through the valve and verify that air flows as specified.
   - If not as specified, replace the PCV valve.

**Specification**

| Condition | Airflow |
|---|---|
| Air applied from port A to B | Yes |
| Air applied from port B to A | No |

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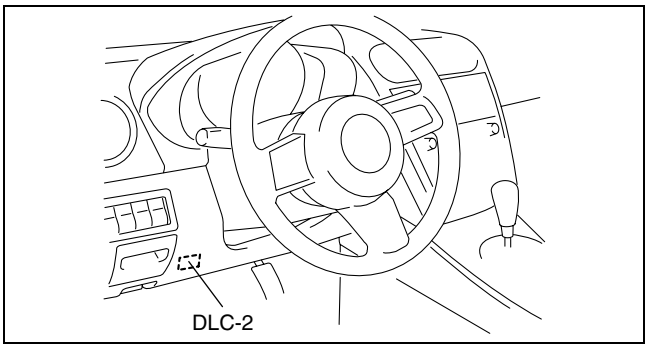
### WARM-UP THREE-WAY CATALYTIC CONVERTER (WU-TWC) INSPECTION[L3 WITH TC]

id011639801200

**Caution**
- **Perform the following procedures, DTC P0421 is indicated only.**

1. Connect the M-MDS to the DLC-2.
2. Start the engine and warm it up to normal operating temperature.
3. Turn off the engine.
4. Verify that the engine compression is within the specification. (See 01-10-9 COMPRESSION INSPECTION[L3 WITH TC].)
   - If the compression pressure is not within the specification, repair or replace the malfunction part.
5. Drive the vehicle for **10 min at 65— 96 km/h {40— 60 mph}** to allow the WU-TWC to reach operating
6. Stop the vehicle and leave it in a safe space.
7. Access Test ID 10:21:80 on the “Diagnostic Monitoring Test Result” function.
8. Verify that the test result is within the specified indicated on the M-MDS.
   - If it is not as specified, replace the WU-TWC. (See01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)

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# 01-17 CHARGING SYSTEM [L3 WITH TC]

**CHARGING SYSTEM LOCATION INDEX [L3 WITH TC] . . . . . 01-17–1**
**BATTERY REMOVAL/INSTALLATION [L3 WITH TC] . . . . . 01-17–2**
Battery Box Installation Note . . . . . **01-17–2**
**BATTERY INSPECTION [L3 WITH TC] . . . . . 01-17–2**
Electrolyte Specific Gravity . . . . . **01-17–2**
Battery Voltage. . . . . **01-17–3**
Back-up Current. . . . . **01-17–3**
**BATTERY RECHARGING [L3 WITH TC] . . . . . 01-17–4**
**GENERATOR REMOVAL/INSTALLATION [L3 WITH TC] . . . . . 01-17–4**
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Generator Installation Note . . . . . **01-17–5**
**GENERATOR INSPECTION [L3 WITH TC] . . . . . 01-17–6**
Generator Warning Light. . . . . **01-17–6**
Generator . . . . . **01-17–6**
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**GENERATOR DISASSEMBLY/ASSEMBLY [L3 WITH TC] . . . . . 01-17–11**



## CHARGING SYSTEM LOCATION INDEX[L3 WITH TC]

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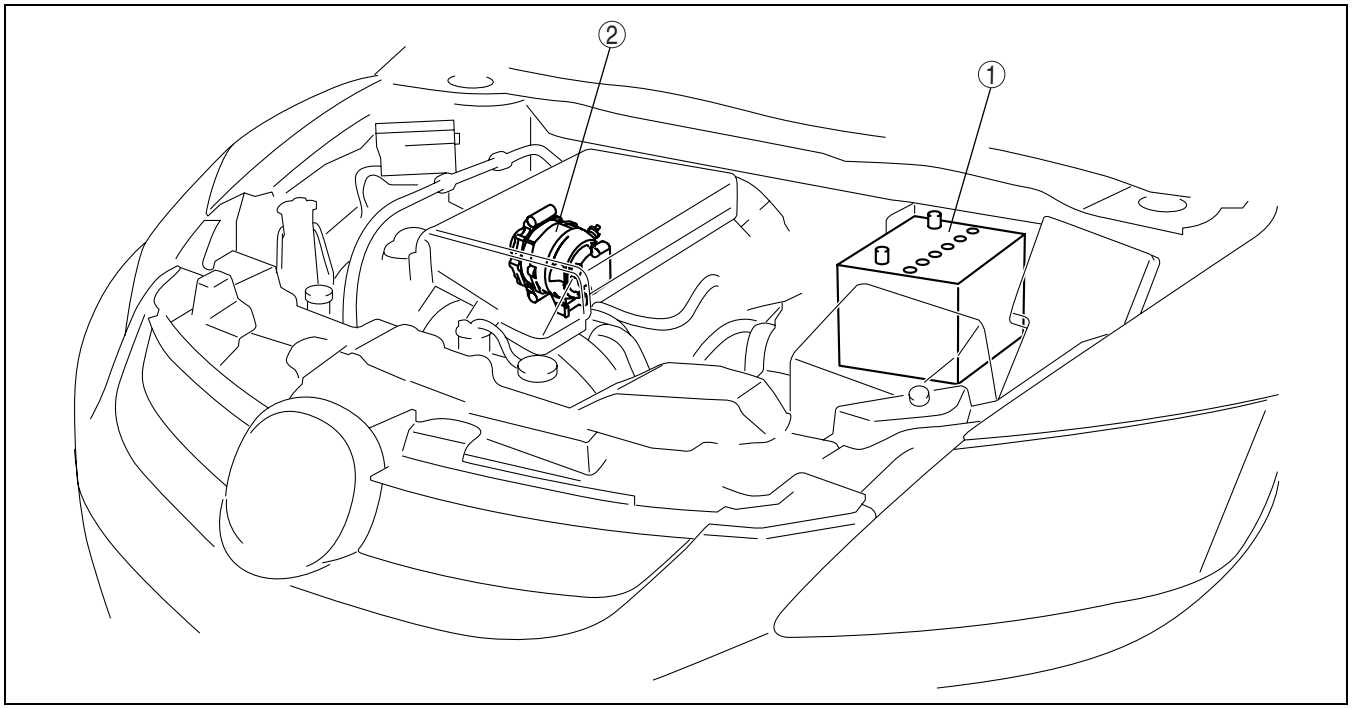


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| | |
|---|---|
| 1 | Battery<br>(See 01-17-2 BATTERY REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-17-2 BATTERY INSPECTION[L3 WITH TC].)<br>(See 01-17-4 BATTERY RECHARGING[L3 WITH TC].) |

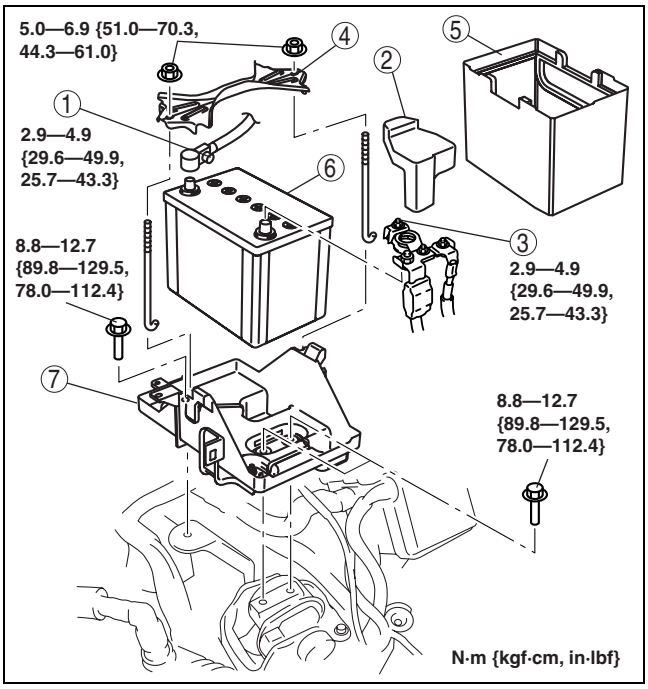
| | |
|---|---|
| 2 | Generator<br>(See 01-17-4 GENERATOR REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-17-6 GENERATOR INSPECTION[L3 WITH TC].)<br>(See 01-17-11 GENERATOR DISASSEMBLY/ ASSEMBLY[L3 WITH TC].) |

## BATTERY REMOVAL/INSTALLATION[L3 WITH TC]

id011739800500

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

| | |
|---|---|
| 1 | Negative battery cable |
| 2 | Positive battery cable cap |
| 3 | Positive battery cable |
| 4 | Battery clamp |
| 5 | Battery box<br>(See 01-17-2 Battery Box Installation Note.) |
| 6 | Battery |
| 7 | Battery tray |

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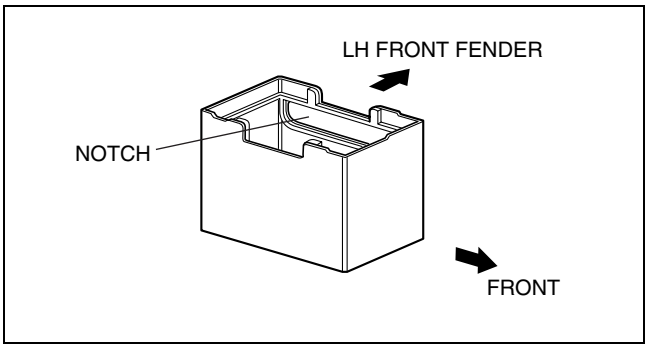
### Battery Box Installation Note

1. Install the battery box so that the side with the notch points toward the front fender (LH).

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## BATTERY INSPECTION[L3 WITH TC]

id011739800600

**Warning**

- **Since battery acid is toxic, be careful when handling the battery.**
- **Since battery acid is highly corrosive, be careful not to allow it to contact clothing or the vehicle.**
- **In case battery acid contacts skin, eyes, or clothing, flush it immediately with running water. Especially if the acid gets in the eyes, flush with water for more than 15 min and get prompt medical attention.**

### Electrolyte Specific Gravity

1. Measure the electrolyte specific gravity using a hydrometer.
   - If it is less than the specification, recharge the battery. (See 01-17-4 BATTERY RECHARGING[L3 WITH TC].)

**Battery electrolyte specific gravity [20 °C {68 °F}]**
**1.22— 1.29**

**Battery Voltage**

1. Inspect the battery as follows:

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | Measure the battery positive voltage. | 12.4 V or more | Go to Step 3. |
| | | Less than 12.4 V | Go to the next step. |
| 2 | Quick charge for **30 min** and recheck voltage. | 12.4 V or more | Go to the next step. |
| | | Less than 12.4 V | Replace the battery. |
| 3 | Using the battery load tester, apply load current (see battery load test current) and record battery voltage after **15 s**. Is voltage more than the specification? | Yes | Normal |
| | | No | Replace the battery. |

**Battery load test current**
**55D23L (48): 180 A**
**80D26L (55): 195 A**

**Standard specification**

| Battery temp. (°C {°F}) | Minimum voltage (V) |
|---|---|
| 4 {39} | 9.3 |
| 10 {50} | 9.4 |
| 16 {61} | 9.5 |
| 21 {70} | 9.6 |

**Back-up Current**

1. Verify that the ignition switch is off (key has been removed) and that all doors are closed.
2. Disconnect the negative battery cable.
3. Connect the tester between the negative battery terminal and negative battery cable, leave the battery undisturbed for **30 min**, and then measure the back-up current.
   - If not within the specification, measure the back-up current while removing the fuses one by one from the inside of the main fuse block and the inside of the fuse block.

**Note**
- If the battery is not left undisturbed for **30 min**, the tester will indicate a high value (**approx. 300 mA**).
- If the key or any electrical accessory is operated within **approx. 30 min** after the tester is connected, the battery must be left undisturbed for **approx. 30 min** from that point.

**Caution**
- **Operating electrical loads while the back-up current is being measured can damage the tester.**

**Note**
- For vehicles with the immobilizer system, the system periodically shifts synchronization of the security light flashing. Therefore, **65 mA (0.1 s)** current is supplied when the security light is illuminated, and **55 mA (2 s)** current is supplied when the security light is not illuminated. In addition, the measuring instrument, which shows the average value, indicates around **60 mA**.

**Battery back-up current**
**Vehicles with immobilizer system: 55— 65 mA**
**Vehicles without immobilizer system: 60 mA or less**

4. Inspect and repair wiring harnesses and connectors of the fuse where the current has decreased.

## BATTERY RECHARGING[L3 WITH TC]

id011739800700

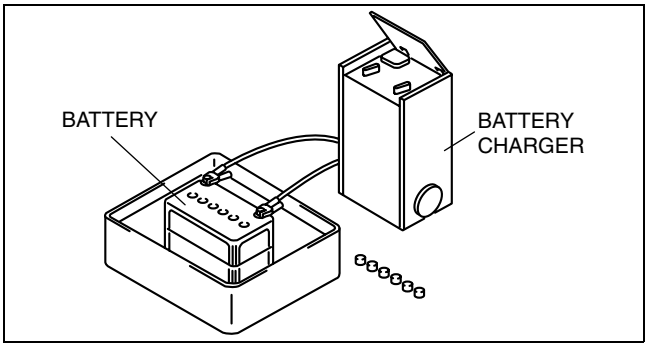
**Warning**
- **Keep all flames away from the battery, otherwise evaporated gas from the battery fluid may catch fire, and cause serious injury.**
- **Remove the battery filler caps when recharging to prevent battery deformation or damage.**

**Caution**
- **Do not quick charge for more than 30 min. It will damage the battery.**

1. Remove the battery and then place it in a pan of water.
2. Connect a battery charger to the battery and adjust the charging current as follows.

**Battery slow charge current**
**55D23L (48): 4.5— 5.5 A**
**80D26L (55): 5.5— 6.5 A**

**Battery quick charge current [30 min]**
**55D23L (48): 30 A**
**80D26L (55): 35 A**

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3. After the battery is recharged, verify that the voltage is within the specification and remains at the same value for **1 h or more** after the recharging has been completed.
   - If not within the specification, replace the battery.

**Standard voltage**
**12.4 V or more**

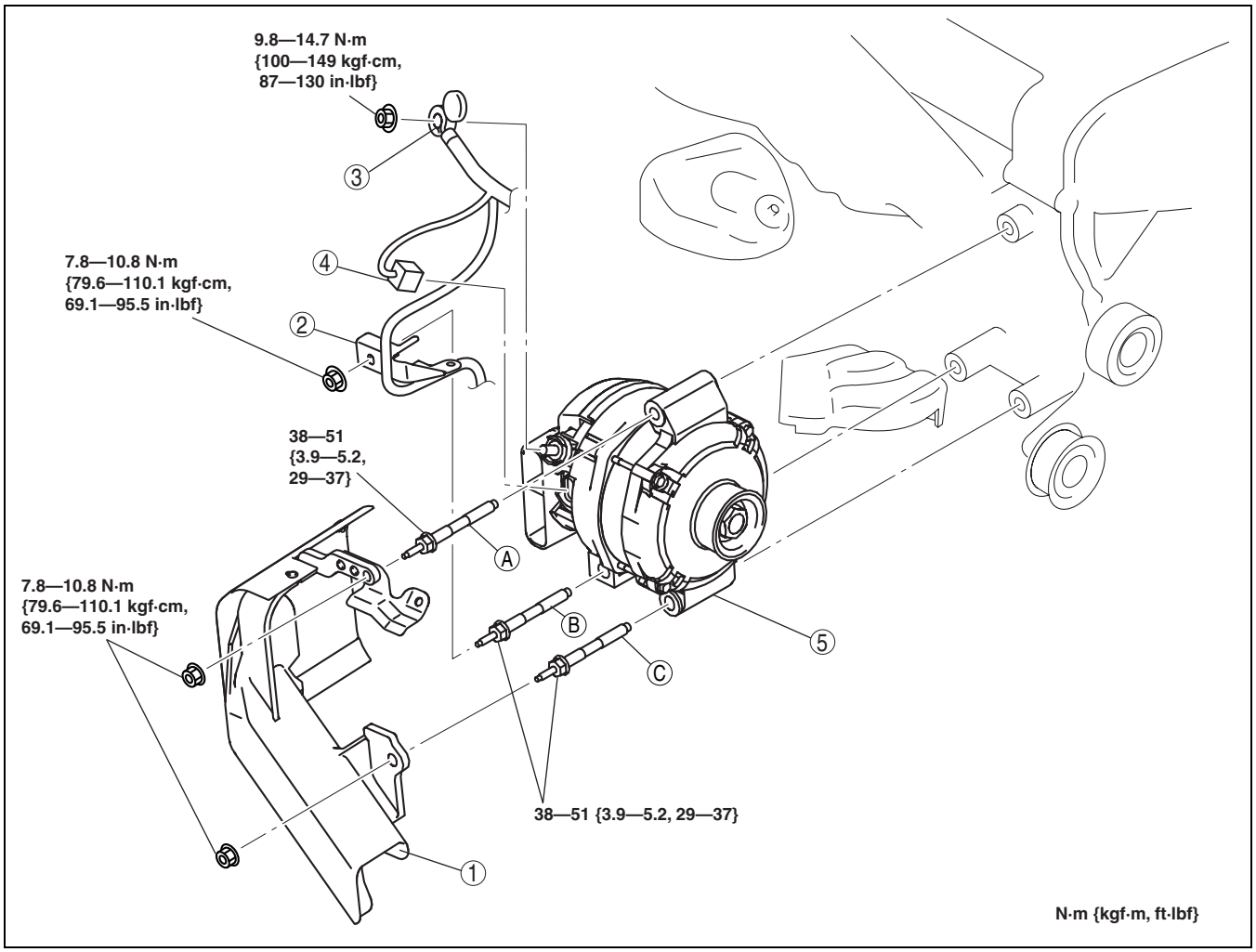
## GENERATOR REMOVAL/INSTALLATION[L3 WITH TC]

id011739800200

**Warning**
- **Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.**
- **When the battery cables are connected, touching the vehicle body with generator terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the negative battery cable before performing the following operation.**

**Caution**
- **The generator can be damaged by the heat from the exhaust manifold. Make sure the generator duct is installed securely.**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct and charge air cooler cover. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the front splash shield (RH).
4. Remove the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

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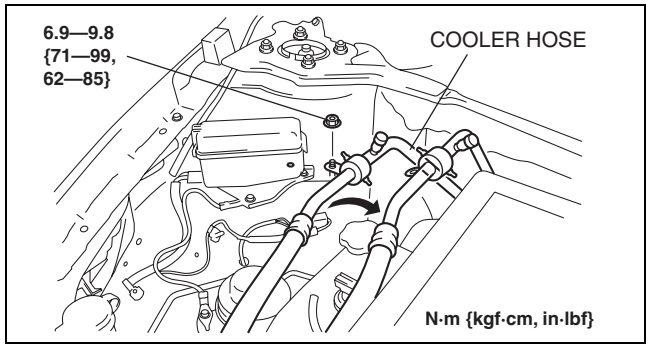
| | |
|---|---|
| 1 | Generator duct |
| 2 | Wiring harness bracket |
| 3 | Terminal B cable |

| | |
|---|---|
| 4 | Generator connector |
| 5 | Generator<br>(See 01-17-5 Generator Removal Note.)<br>(See 01-17-5 Generator Installation Note.) |

**Generator Removal Note**

1. Remove the cooler hose bracket nut and set the cooler hose out of the way before performing the generator removal/installation.
2. Remove the generator from above the engine compartment.

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**Generator Installation Note**

1. Tighten bolt A temporarily.
2. Tighten bolt B, C to the specified tightening torque.
3. Tighten bolt A to the specified tightening torque.

## GENERATOR INSPECTION[L3 WITH TC]

id011739800300

**Caution**
- **Do not apply direct battery positive voltage to generator terminal D, otherwise it could cause damage to the internal parts (power transistor) of the generator.**

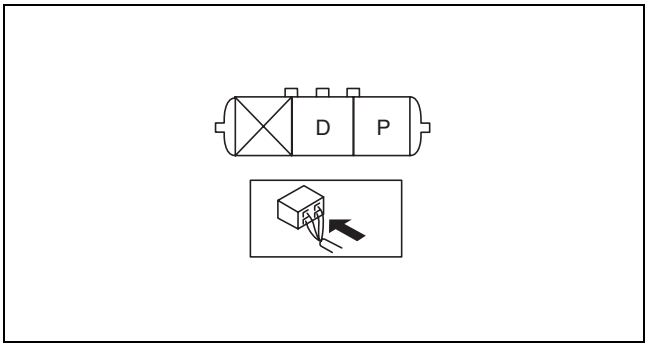
### Generator Warning Light

1. Verify that the battery is fully charged.
2. Verify that the drive belt deflection/tension is correct. (See 01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)
3. With the ignition switch turned to the ON position, verify that the generator warning light illuminates.
   - If it does not illuminate, inspect the generator warning light and the wiring harness.
     — If the generator warning light and the wiring harness are normal, inspect the PCM.
4. Verify that the generator warning light goes out after the engine is started.
   - If it does not go out, inspect if any one of the following DTCs in the on-board diagnostic system are displayed: P0112, P0113, P2502, P2503, P2504. (See 01-02-13 DTC TABLE[L3 WITH TC].)

### Generator

### Voltage

1. Verify that the battery is fully charged.
2. Verify that the drive belt deflection/tension is correct. (See 01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)
3. Turn off all electrical loads.
4. Start the engine.
5. Verify that the generator rotates smoothly without any noise while the engine is running.
   - If there is any noise, find the cause and repair or replace the generator.
6. Measure the voltage at each terminal using a tester.
   - If it is not as specified, find the cause and repair or replace the applicable part.



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**Generator standard voltage [IG-ON]**
**Terminal B: B+**
**Terminal P: Approx. 1 V or less**
**Terminal D: Approx. 0 V**

**Generator standard voltage [Idle, 20 °C {68 °F}]**
**Terminal B: 13— 15 V**
**Terminal P: Approx. 3— 8 V**
**Terminal D: Turn the electrical loads (headlights, blower motor, rear window defroster) on and verify that the voltage reading increases.**

### Current

**Note**
- Since the charging current decreases rapidly after starting the engine, carry out the following procedure quickly, and read the maximum current value.

1. Verify that the battery is fully charged.
2. Verify that the drive belt deflection/tension is correct. (See 01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)
3. Disconnect the negative battery cable.
4. Connect a tester, which can read **120 A or more**, between generator terminal B and the wiring harness.
5. Connect the negative battery cable.
6. Turn off all electrical loads.
7. Start the engine.
8. Increase engine speed to **2,500 rpm.**

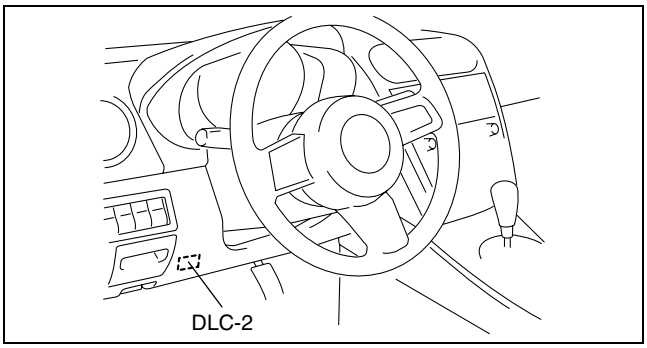
**Note**
- When the electrical load on the vehicle is low, the specified current cannot be verified although the generator is normal. In this case, increase the electrical load (Leave the headlights turned on for a while, then discharge the battery, or use a similar method.) and recheck.
- When the generator itself or the ambient temperature are too high, the specified current also cannot be verified. In this case, cool down the generator and recheck.

9. Turn the following electrical loads on and verify that the current reading increases more than the minimum value indicated below.
   — If it is not as specified, go to the PCM and generator shearing inspection. (See 01-17-7 PCM and generator shearing inspection.)
   - Headlights (high-beam)
   - Blower motor (HI)
   - Rear window defroster
   - Brake lights

**Generator generated current minimum value**
**70 % of the nominal output current (nominal output current: 110 A)**
**[Ambient temp. 20 °C {68 °F}, voltage 13.0— 15.0 V, both engine and generator are hot]**

**PCM and generator shearing inspection**

1. Connect the M-MDS to the DLC-2.

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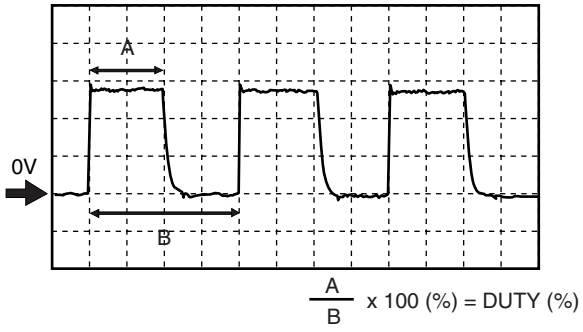
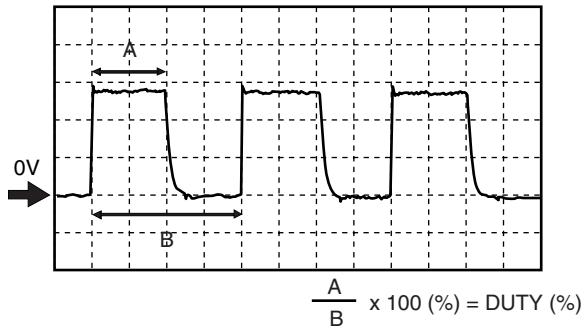
2. Inspect as follows:

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | Measure the generator terminal B voltage when the electrical loads[*1] are on and off. | 15 V or more | Go to Step 2. |
| | | 13— 15 V | Normal[*2] |
| | | 13 V or less | Go to Step 3. |
| 2 | Monitor the ALTT V PID using the M-MDS, or measure the voltage of PCM terminal 2AJ using a tester. Is the voltage between 13 and 15 V ? | Yes | Go to Step 4. |
| | | No | PCM input error. |
| 3 | Monitor the ALTT V PID using the M-MDS, or measure the voltage of PCM terminal 2AJ using a tester. Is the voltage between 13 and 15 V ? | Yes | Go to Step 5. |
| | | No | PCM input error. |
| 4 | Monitor the ALTF PID using the M-MDS, or calculate the duty value of the PCM terminal 2AI using an oscilloscope. Is the duty value 100 **% ?**   $\frac{A}{B}$ x 100 (%) = DUTY (%) | Yes | PCM input error. |
| | | No | PCM, generator, or both are not normal. |

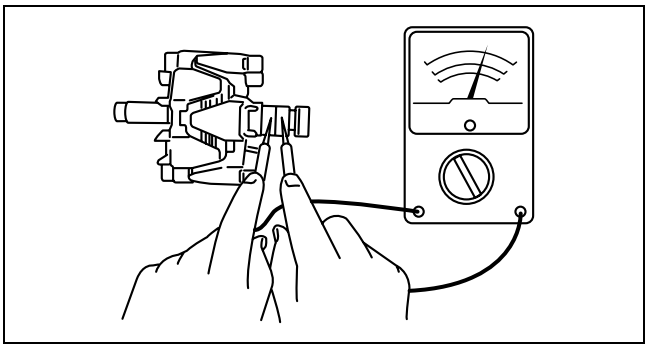
| Step | Inspection | | Action |
|---|---|---|---|
| 5 | Monitor the ALTF PID using the M-MDS, or calculate the duty value of the PCM terminal 2AI using an oscilloscope. Is the duty value 0 **% ?**   $\frac{A}{B}$ x 100 (%) = DUTY (%) | Yes | PCM input error. |
| | | No | PCM, generator, or both are not normal. |

*1 : Headlights, blower motor, rear window defroster, and brake lights.
*2 : If the generator field coil duty value does not change when electrical loads (such as headlights, blower motor, rear window defroster, brake lights) are on or off, inspection with discharged battery is needed.

**Generator Inner Parts**
**Rotor**

1. Measure the resistance between the slip rings using a tester.
   - If not within the specification, replace the rotor.

   **Generator rotor resistance (between slip rings) [20 °C {68 °F}]**
   **1.8— 2.2 ohm**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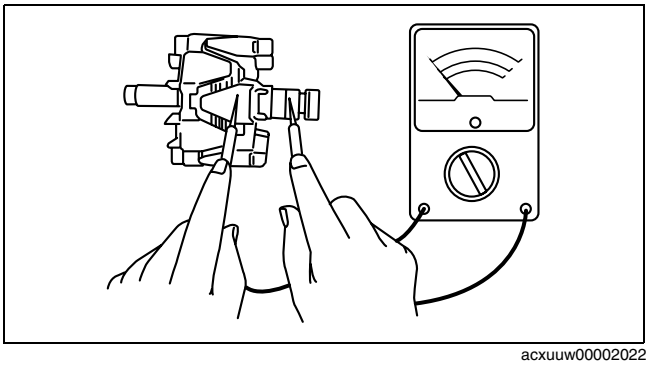
2. Verify that there is no continuity between the slip ring and core using a tester.
   - If there is continuity, replace the rotor.
3. Inspect the slip ring surface condition.
   - If the slip ring surface is rough, use a lathe or fine sandpaper to smooth it.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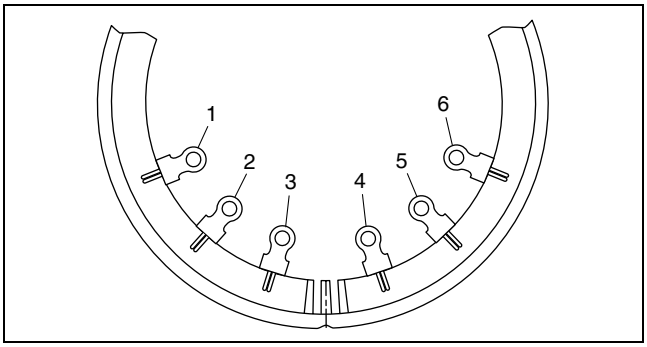
**Stator coil**

1. Verify that the continuity is as indicated in the table.

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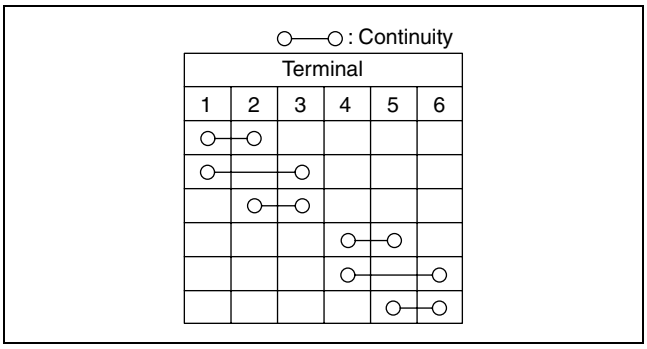
- If there is any malfunction, replace the stator.

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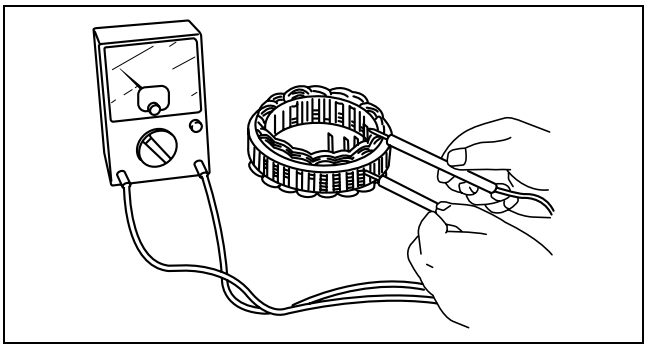
2. Verify that there is no continuity between the stator coil leads and core using a tester.
   - If there is continuity, replace the stator coil.



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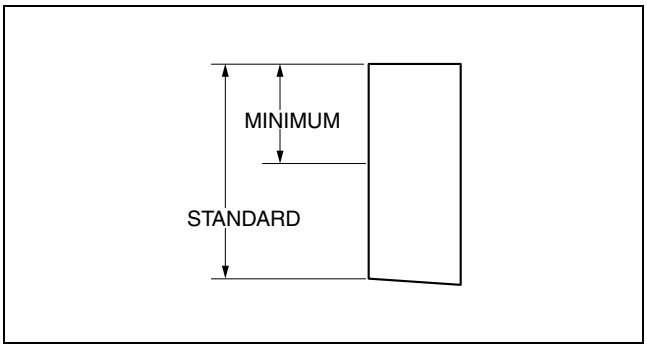
**Brush**

1. Inspect brushes for wear.
   - If any brush is worn almost to or beyond the limit, replace all of the brushes.

**Generator brush length**
**Standard: 22.5 mm {0.89 in}**
**Minimum: 5.0 mm {0.20 in}**

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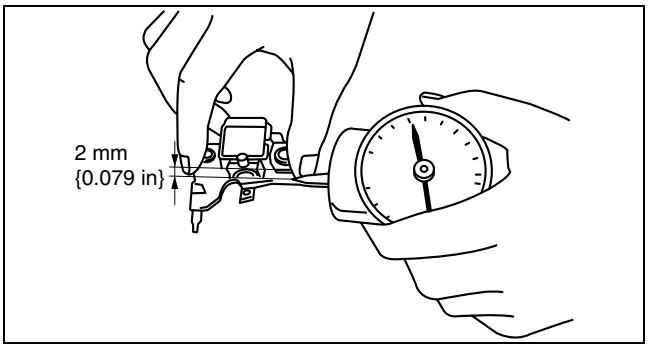
**Brush spring**

1. Measure the force of the brush spring using a spring pressure gauge.
2. Read the spring pressure gauge at the brush tip projection of **2 mm {0.079 in}.**
   - Replace the brush spring if necessary.

**Generator brush spring force**
**Standard: 4.1— 5.3 N {0.42— 0.54 kgf, 0.92— 1.19 lbf}**
**Minimum: 1.7 N {0.17 kgf, 0.38 lbf}**



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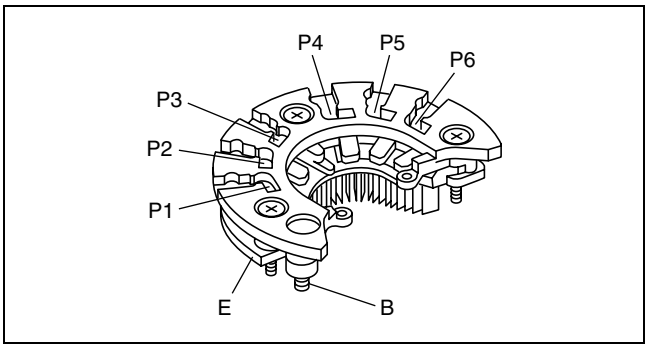
**Rectifier (Using an analog circuit tester)**

1. Inspect for continuity of the diodes using an analog circuit tester.
   - If not as specified, replace the rectifier.

**Specification**

| Negative | Positive | Continuity |
|---|---|---|
| E | P1, P2, P3, P4, P5, P6 | Yes |
| B | | No |
| P1, P2, P3, P4, P5, P6 | E | No |
| | B | Yes |



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**Rectifier (Using a digital circuit tester)**

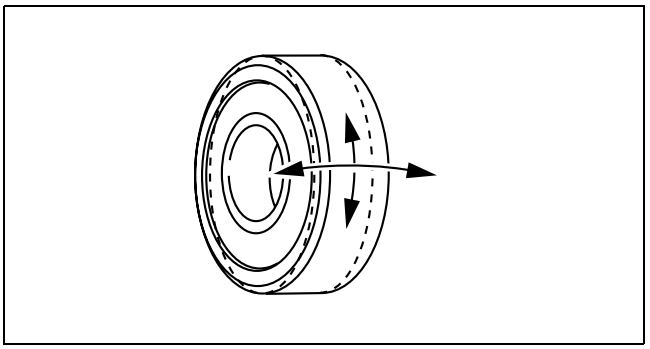
1. Inspect for continuity of the diodes using a digital circuit tester.
   - If not as specified, replace the rectifier.

**Specification**

| Negative | Positive | Continuity |
|---|---|---|
| E | P1, P2, P3, P4, P5, P6 | No |
| B | | Yes |
| P1, P2, P3, P4, P5, P6 | E | Yes |
| | B | No |

**Bearing**

1. Inspect for abnormal noise, looseness, and sticking.
   - Replace the bearing if necessary.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## GENERATOR DISASSEMBLY/ASSEMBLY[L3 WITH TC]

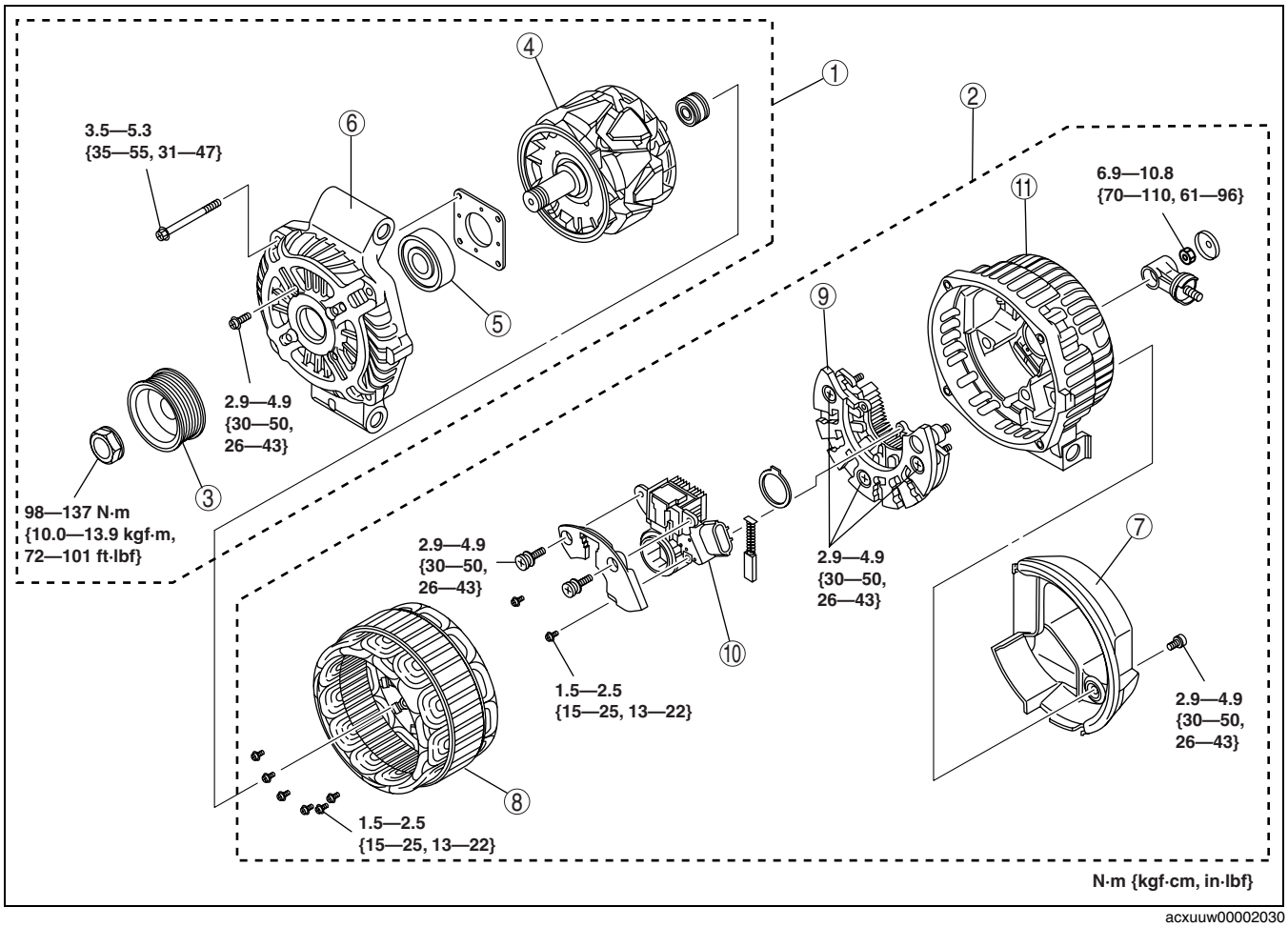
id011739800400

**Caution**

- **Melt the solder quickly, otherwise the diodes (rectifier) and regulator will be damaged by excessive heat.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.



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| | |
|---|---|
| 1 | Rotor component |
| 2 | Stator coil component |
| 3 | Pulley |
| 4 | Rotor |
| 5 | Bearing |
| 6 | Front cover |

| | |
|---|---|
| 7 | Generator heat insulator |
| 8 | Stator coil |
| 9 | Rectifier |
| 10 | Brush holder |
| 11 | Rear bracket |

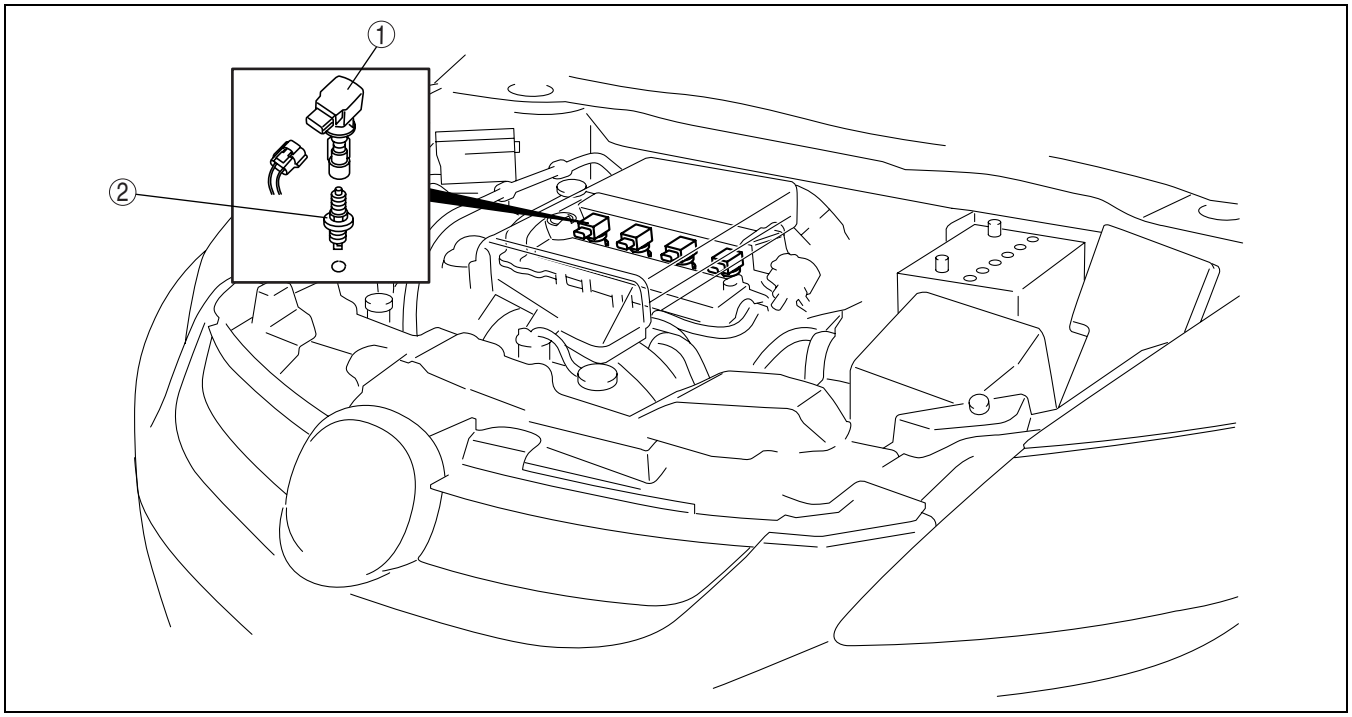
# 01-18 IGNITION SYSTEM [L3 WITH TC]

**IGNITION SYSTEM LOCATION INDEX [L3 WITH TC] . . . . . 01-18–1**
**IGNITION COIL REMOVAL/INSTALLATION [L3 WITH TC] . . . . . 01-18–2**
**IGNITION COIL INSPECTION [L3 WITH TC] . . . . . 01-18–2**
Ignition Coil Inspection . . . . . **01-18–2**
Ignition Coil with Built-in Igniter Inspection . . . . . **01-18–2**
**SPARK PLUG REMOVAL/INSTALLATION [L3 WITH TC] . . . . . 01-18–3**
**SPARK PLUG INSPECTION [L3 WITH TC] . . . . . 01-18–3**
Specification . . . . . **01-18–3**
Plug Gap Inspection . . . . . **01-18–3**
Cleaning . . . . . **01-18–3**
Visual Inspection . . . . . **01-18–4**
Resistance Inspection . . . . . **01-18–4**



## IGNITION SYSTEM LOCATION INDEX[L3 WITH TC]

id011839800100

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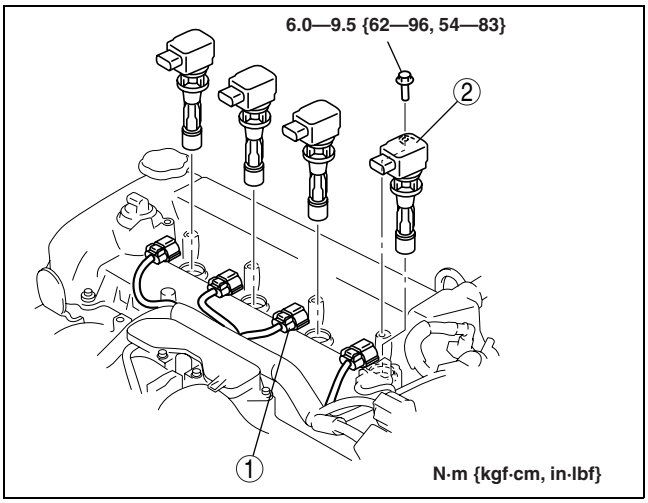
| | |
|---|---|
| 1 | Ignition coil<br>(See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 01-18-2 IGNITION COIL INSPECTION[L3 WITH TC].) |
| 2 | Spark plug<br>(See 01-18-3 SPARK PLUG REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 01-18-3 SPARK PLUG INSPECTION[L3 WITH TC].) |

## IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC]

id011839800200

1. Disconnect the negative battery cable.
2. Remove the charge air cooler. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal..

| | |
|---|---|
| 1 | Connector |
| 2 | Ignition coil |

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## IGNITION COIL INSPECTION[L3 WITH TC]

id011839800300

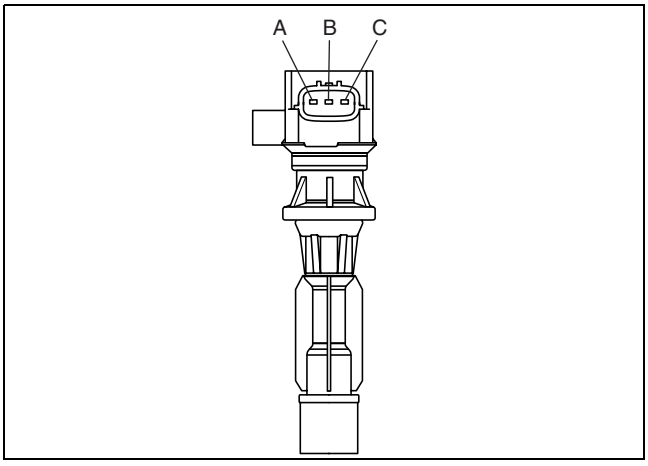
### Ignition Coil Inspection

1. Perform the spark test and identify the malfunctioning cylinder.
2. Replace the ignition coil of the malfunctioning cylinder with that of a normal cylinder, and reperform the spark test.
   - If the spark is not normal due to a malfunctioning ignition coil, replace that ignition coil.
   - It is unlikely that all four ignition coils fail to operate properly. To prevent replacing a normal component, perform the above procedure, identify the malfunctioning ignition coil, and replace it.

### Ignition Coil with Built-in Igniter Inspection

1. Disconnect the negative battery cable.
2. Remove the charge air cooler. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Disconnect the ignition coil connector.
4. Measure the resistance between each terminal on the ignition coil connector using an analog circuit tester.
   - If the measurement corresponds to the table, replace the ignition coil.

| Item | Tester Connection Position | | Condition |
|---|---|---|---|
| | Positive | Negative | |
| Terminal | C | A | 0 ohm is not normal (∞ ohm is normal) |
| | A | C | |
| | C | B | |
| | B | C | |
| | A | B | ∞ or 0 ohm is not normal (several kilohm is normal) |
| | B | A | |

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## SPARK PLUG REMOVAL/INSTALLATION[L3 WITH TC]

id011839800400

**Caution**
- **If a spark plug that is not as specified is installed, engine performance will be deteriorated. Install only the specified spark plug when replacing.**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the ignition coils. (See 01-18-2 IGNITION COIL REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the spark plugs using a plug-wrench.
5. Install in the reverse order of removal.

**Tightening torque**
**10— 14 N·m {1.1— 1.4 kgf·m, 8.0— 10 ft·lbf}**



## SPARK PLUG INSPECTION[L3 WITH TC]

id011839800500

**Specification**

**Spark plug type**
**L3K9 18 110A, L3Y3 18 110**

**Plug Gap Inspection**

**Caution**
- **To avoid possible damage to the tip, do not adjust the plug gap.**
- **To prevent damaging the tip, use a wire type plug gap gauge when inspecting the plug gap.**

1. Measure the spark plug gap using a wire type plug gap gauge.
   - If not within the specification, replace the spark plug.

**Spark plug gap**
**0.7— 0.8 mm {0.028— 0.031 in}**

**Cleaning**

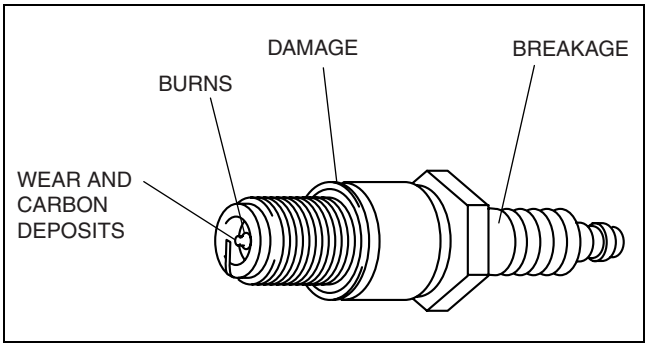
**Caution**
- **Carbon may adhere to the tip of the spark plug during vehicle delivery or repeated short distance driving during the winter time. If there is any malfunction such as rough idling or start difficulty due to carbon adhesion causing plug fouling, burn off the carbon by performing no-load racing of the engine.**
- **When performing the no-load racing, apply the side brake and foot brake, move the selector lever to P position to prevent an accident and serious injury.**
- **To avoid possible damage to the spark plug tip, do not use a wire brush for cleaning.**

**Note**
- To avoid possible damage to the tip, use gasoline to clean the spark plugs after removing dirt.
- If the accelerator pedal is depressed continuously for a specified time, the engine speed may decrease to the idle speed. This is due to the fuel cut control operation, which prevents overheating, and it does not indicate a malfunction.
- Do not perform no-load racing at high engine speed continuously for **10 s or more**.

1. If there is carbon adhering to the spark plug, perform no-load racing at **4,000 rpm** for **2 min**, **2 times**.

**Visual Inspection**

1. Inspect the following items:
   - If any of the following malfunctions are indicated, replace the spark plug.
     — Insulator breakage
     — Worn electrode
     — Damaged gasket
     — Badly burned insulator (sparking side)

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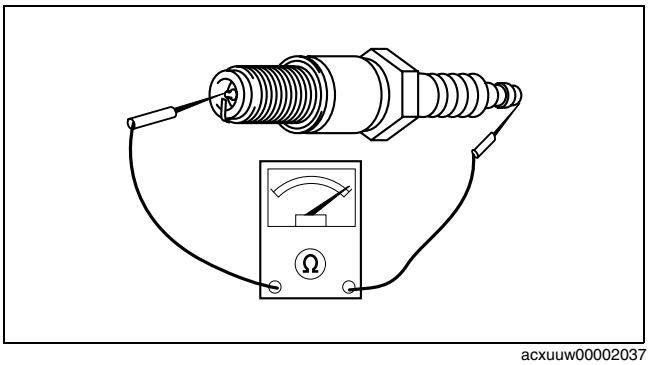
**Resistance Inspection**

1. Measure the resistance of the spark plug using a tester as shown in the figure.
   - If not within the specification, replace the spark plug.

   **Spark plug resistance [25°C {77 °F}]**
   **3.0— 7.5 kilohms**

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# 01-19 STARTING SYSTEM [L3 WITH TC]

**STARTING SYSTEM LOCATION INDEX [L3 WITH TC] . . . . . 01-19–1**
**STARTER REMOVAL/INSTALLATION [L3 WITH TC] . . . . . 01-19–2**
Heater Pipe Removal Note . . . . . 01-19–3
Starter Removal Note . . . . . 01-19–3
Starter Installation Note . . . . . 01-19–3
**STARTER INSPECTION [L3 WITH TC] . . . . . 01-19–4**
On-vehicle Inspection . . . . . 01-19–4
No-load Test . . . . . 01-19–4
Magnetic Switch Operation Inspection . . . . . 01-19–4
Pinion Gap Inspection . . . . . 01-19-4–1
Starter Inner Parts Inspection . . . . . 01-19-4–1
**STARTER DISASSEMBLY/ASSEMBLY [L3 WITH TC] . . . . . 01-19–7**



## STARTING SYSTEM LOCATION INDEX[L3 WITH TC]

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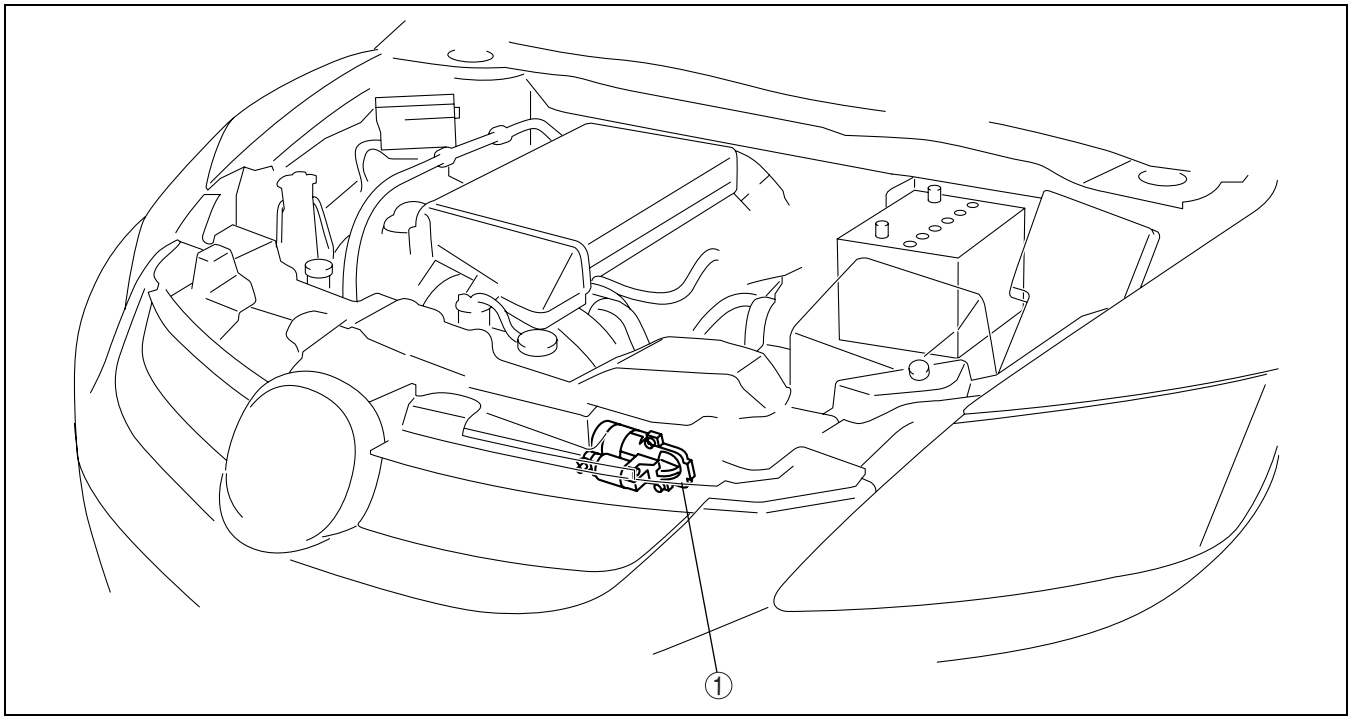


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| | |
|---|---|
| 1 | Starter<br>(See 01-19-2 STARTER REMOVAL/ INSTALLATION[L3 WITH TC].)<br>(See 01-19-4 STARTER INSPECTION[L3 WITH TC].)<br>(See 01-19-7 STARTER DISASSEMBLY/ ASSEMBLY[L3 WITH TC].) |

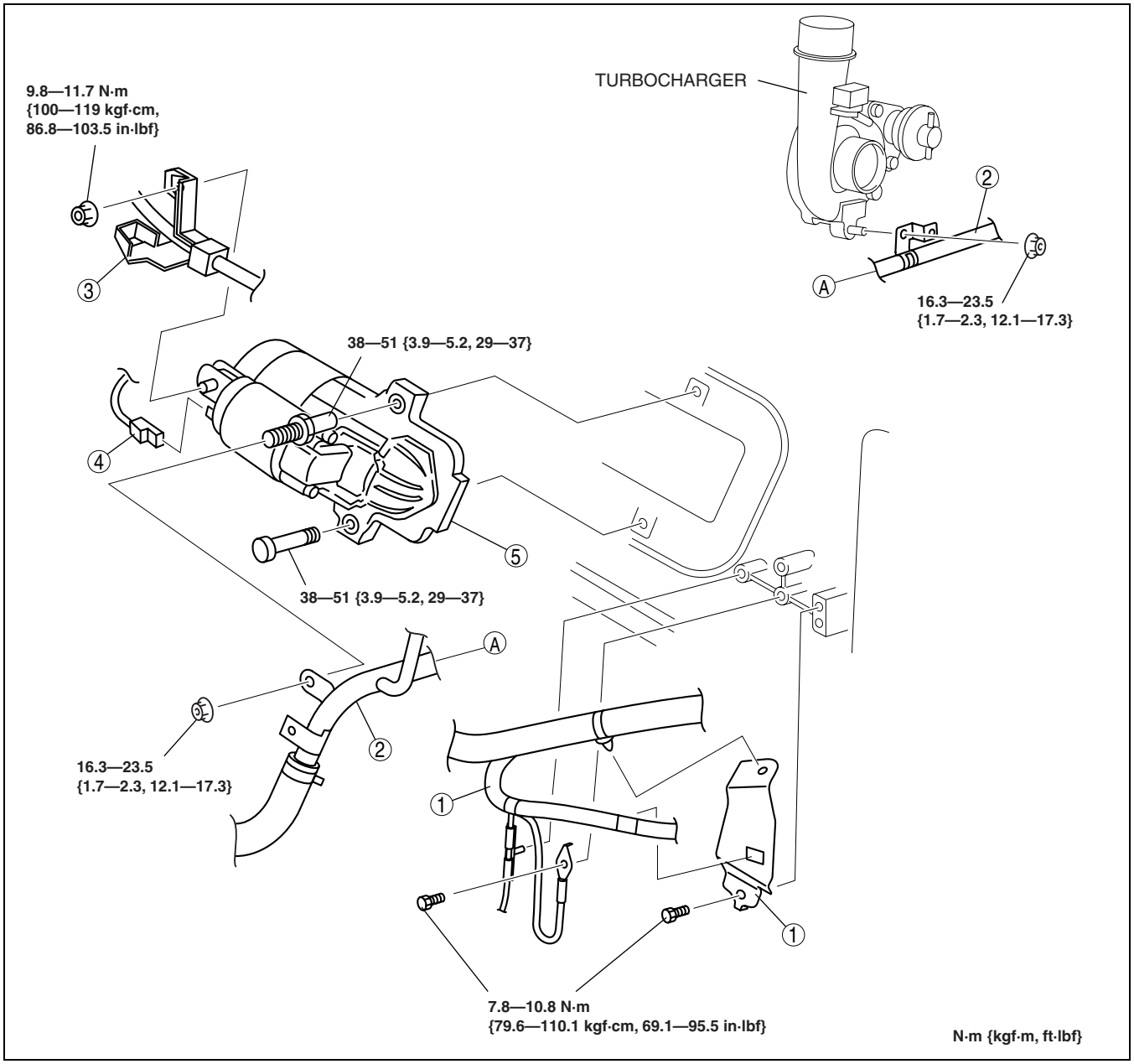
## STARTER REMOVAL/INSTALLATION[L3 WITH TC]

id011939800200

**Warning**

- **Remove and install all parts when the engine is cold, otherwise they can cause severe burns or serious injury.**
- **When the battery cables are connected, touching the vehicle body with starter terminal B will generate sparks. This can cause personal injury, fire, and damage to the electrical components. Always disconnect the negative battery cable before performing the following operation.**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the charge air cooler duct, air cleaner and fresh air duct component, and air hose. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

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| | |
|---|---|
| 1 | Wiring harness and wiring harness bracket |
| 2 | Heater pipe<br>(See 01-19-3 Heater Pipe Removal Note.) |
| 3 | Terminal B cable |
| 4 | Terminal S connector |
| 5 | Starter<br>(See 01-19-3 Starter Removal Note.)<br>(See 01-19-3 Starter Installation Note.) |

**Heater Pipe Removal Note**

1. Remove the heater pipe with the water hoses still connected. Position the heater pipe so that it is out of the way.

**Starter Removal Note**

1. Remove the starter from above the engine compartment.

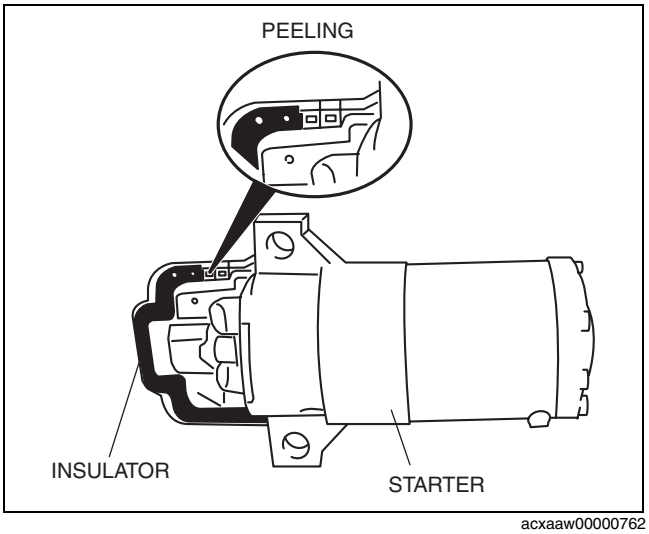
**Starter Installation Note**



**Note**

- If there is peeling on or damage to the insulator, attach a new insulator using the following procedure:

1. Peel off the insulator from the starter completely using a scraper.



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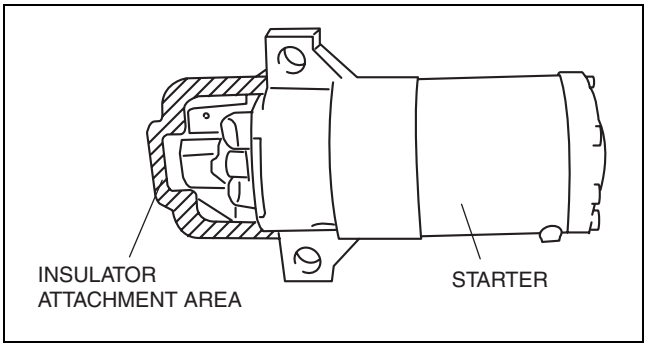
2. Degrease the insulator attachment area.



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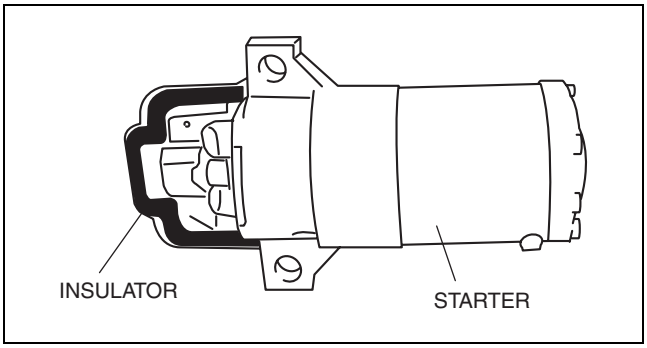
3. Attach a new insulator to the starter.



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## STARTER INSPECTION[L3 WITH TC]

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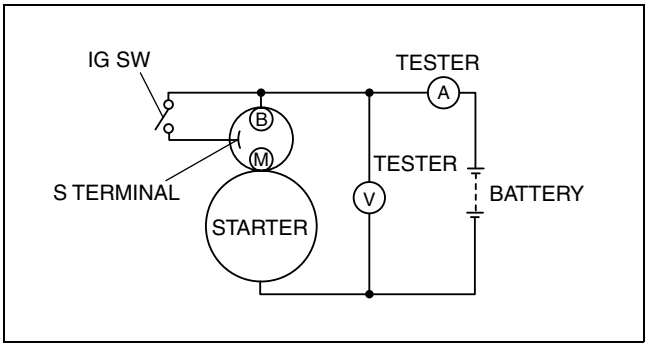
### On-vehicle Inspection

1. Verify that the battery is fully charged.
2. The starter is normal if it rotates smoothly and without any noise when the engine is cranked.
   - If the starter does not operate, inspect the following:
     — Remove the starter, and inspect the starter unit.
     — Inspect the related wiring harnesses, the ignition switch, and the transaxle range switch.

### No-load Test

1. Verify that the battery is fully charged.
2. Connect the starter, battery, and a tester as shown in the figure.
3. Operate the starter and verify that it rotates smoothly.
   - If the starter does not rotate smoothly, inspect the starter unit.
4. Measure the voltage and current while the starter is operating.
   - If not within the specification, replace the starter.

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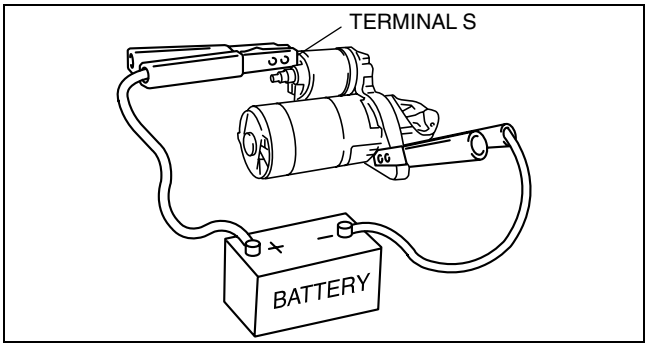
**Starter no-load test voltage**
**11 V**

**Starter no-load test current**
**90 A or less**

### Magnetic Switch Operation Inspection
### Pull-out test

**Note**
- Depending on the battery charge condition, the starter motor pinion may rotate while in an extended state. This is due to current flowing to the starter motor through the pull-in coil to turn the starter motor, and does not indicate an abnormality.

1. Verify that the starter motor pinion is extended while battery positive voltage is connected to terminal S and the starter body is grounded.
   - If the starter motor pinion is not extended, repair or replace the starter.

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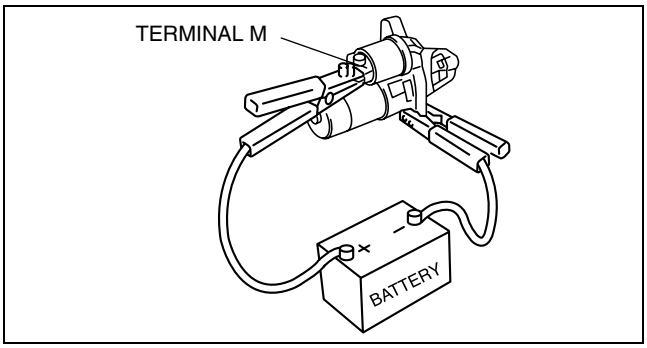
**Return test**

1. Disconnect the motor wire from terminal M.
2. Connect battery positive voltage to terminal M and ground the starter body.
3. Pull out the drive pinion with a screwdriver. Verify that it returns to its original position when released.
   - If it does not return, repair or replace the starter.



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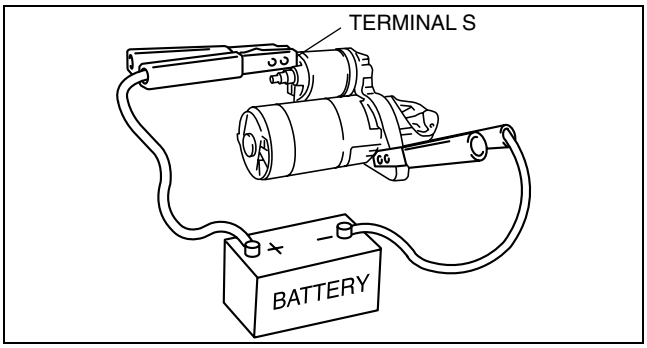
**Pinion Gap Inspection**

1. Pull out the drive pinion with the battery positive voltage connected to terminal S and the starter body grounded.

   **Caution**
   - **Applying power for more than 10 s can damage the starter. Do not apply power for more than 10 s.**



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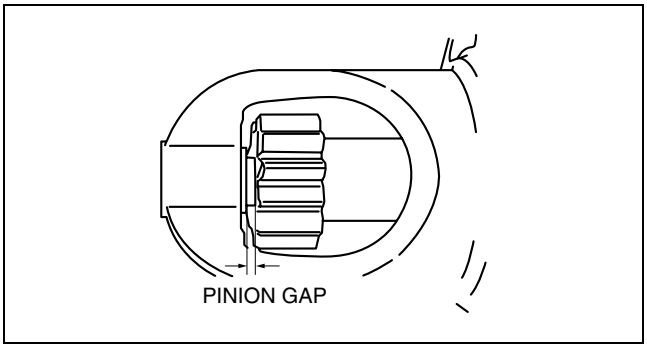
2. Measure the pinion gap while the drive pinion is extended.
   - If not as specified, adjust with an adjustment washer (between drive housing front cover and magnetic switch).

   **Starter pinion gap**
   **0.5— 2.0 mm {0.02— 0.07 in}**



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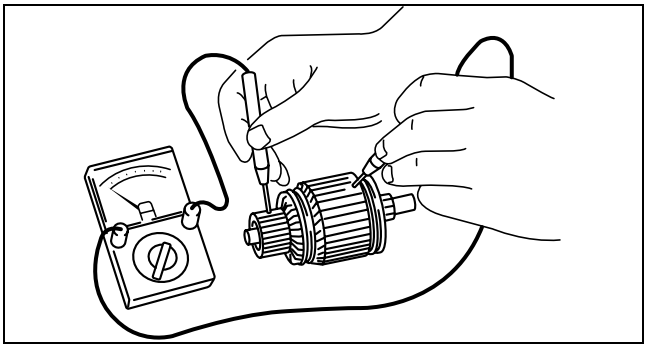
**Starter Inner Parts Inspection**
**Armature**

1. Verify that there is no continuity between the commutator and the core at each segment using a tester.
   - If there is continuity, replace the armature.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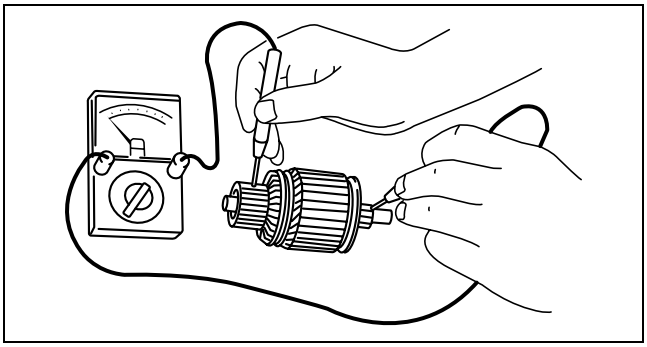
2. Verify that there is no continuity between the commutator and the shaft using a tester.
   - If there is continuity, replace the armature.



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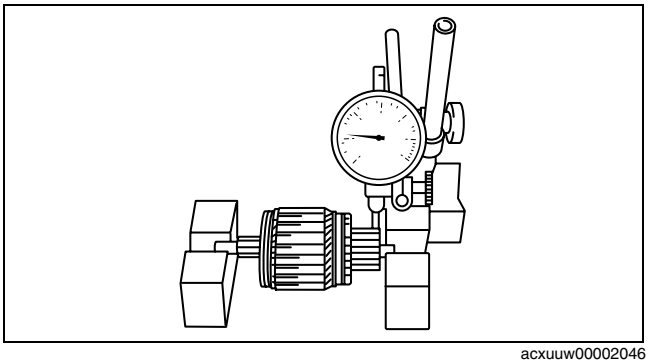
3. Place the armature on V-blocks, and measure the runout using a dial indicator.

   **Starter armature runout**
   **0.05 mm {0.002 in} max.**



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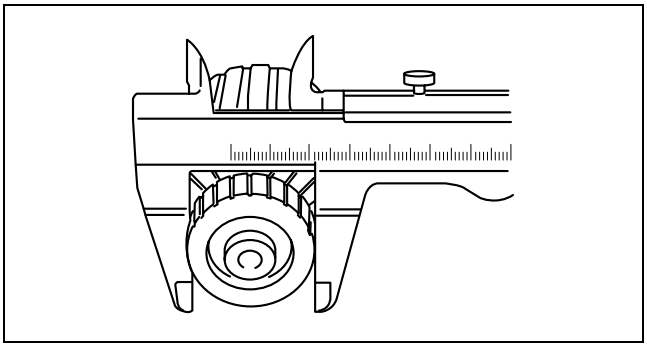
4. Measure the commutator diameter.
   - If not within the minimum specification, replace the armature.

   **Starter commutator diameter**
   **Standard: 29.4 mm {1.16 in}**
   **Minimum: 28.8 mm {1.13 in}**



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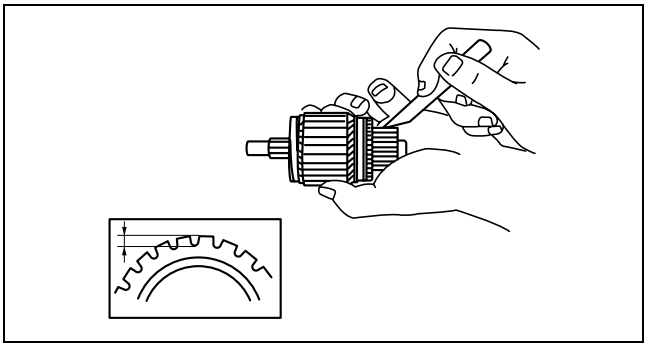
5. Measure the segment groove depth of the commutator.
   - If not within the minimum specification, undercut the grooves to the standard depth.

   **Segment groove depth of starter commutator**
   **Standard: 0.4— 0.6 mm {0.016— 0.023 in}**
   **Minimum: 0.2 mm {0.008 in}**



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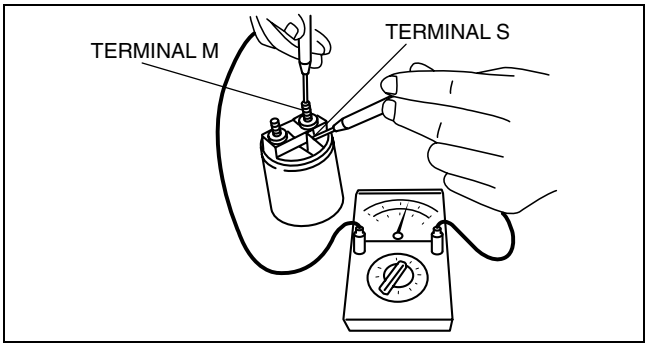
**Magnetic switch**

1. Inspect for continuity between terminals S and M using a tester.
   - If there is no continuity, replace the magnetic switch.

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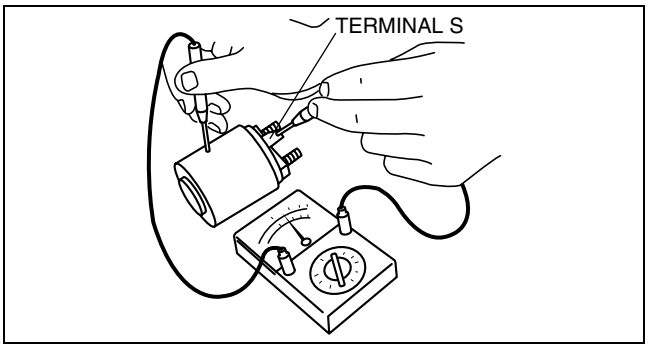
2. Inspect for continuity between terminal S and the body using a tester.
   - If there is no continuity, replace the magnetic switch.

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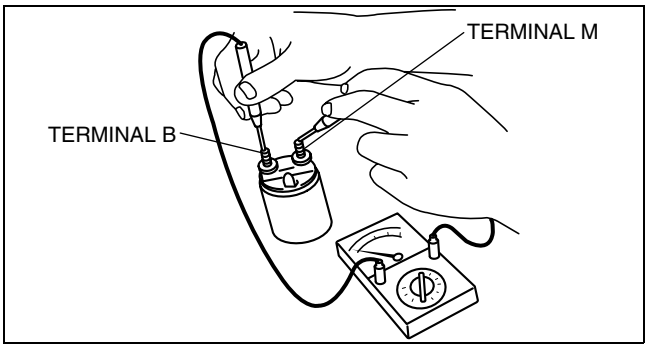
3. Verify that there is no continuity between terminals M and B using a tester.
   - If there is continuity, replace the magnetic switch.

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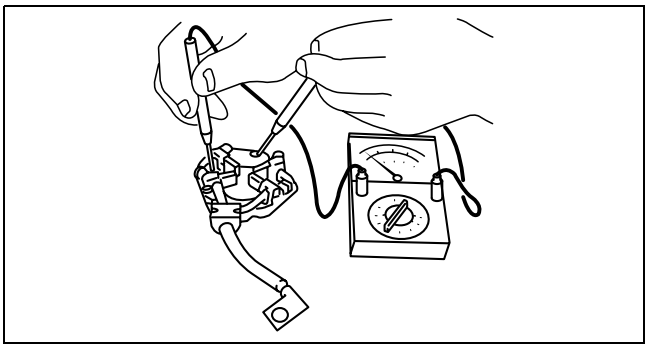
**Brush and brush holder**

1. Verify that there is no continuity between each insulated brush and plate using a tester.
   - If there is continuity, replace the brush holder.



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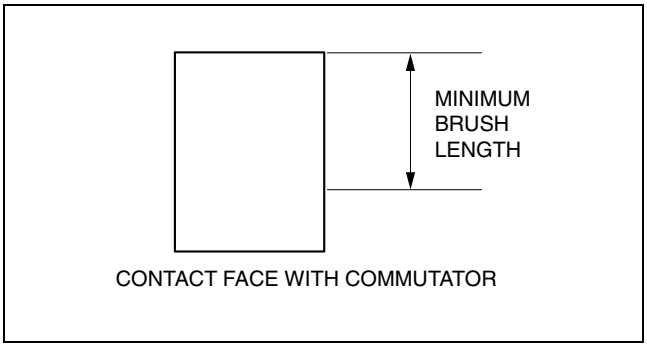
2. Measure the brush length.
   - If any brush is worn almost to or beyond the minimum specification, replace all of the brushes.

**Starter brush length**
**Standard: 12.3 mm {0.48 in}**
**Minimum: 7.0 mm {0.28 in}**

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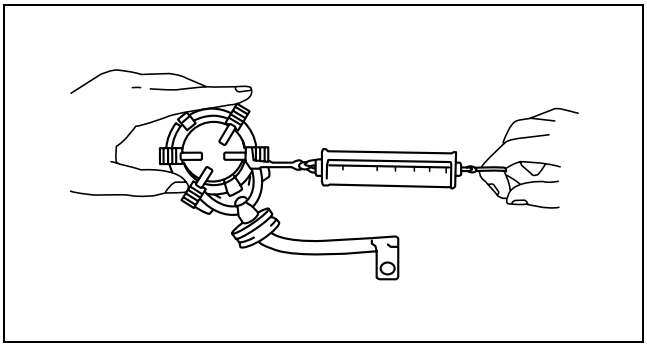
3. Measure the brush spring force using a spring balance.
   - If not within the minimum specification, replace the brush and brush holder component.

**Starter brush spring force**
**Standard: 18.3— 24.9 N {1.87— 2.53 kgf, 4.12— 5.59 lbf}**
**Minimum: 5.9 N {0.6 kgf, 1.3 lbf}**



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## STARTER DISASSEMBLY/ASSEMBLY[L3 WITH TC]

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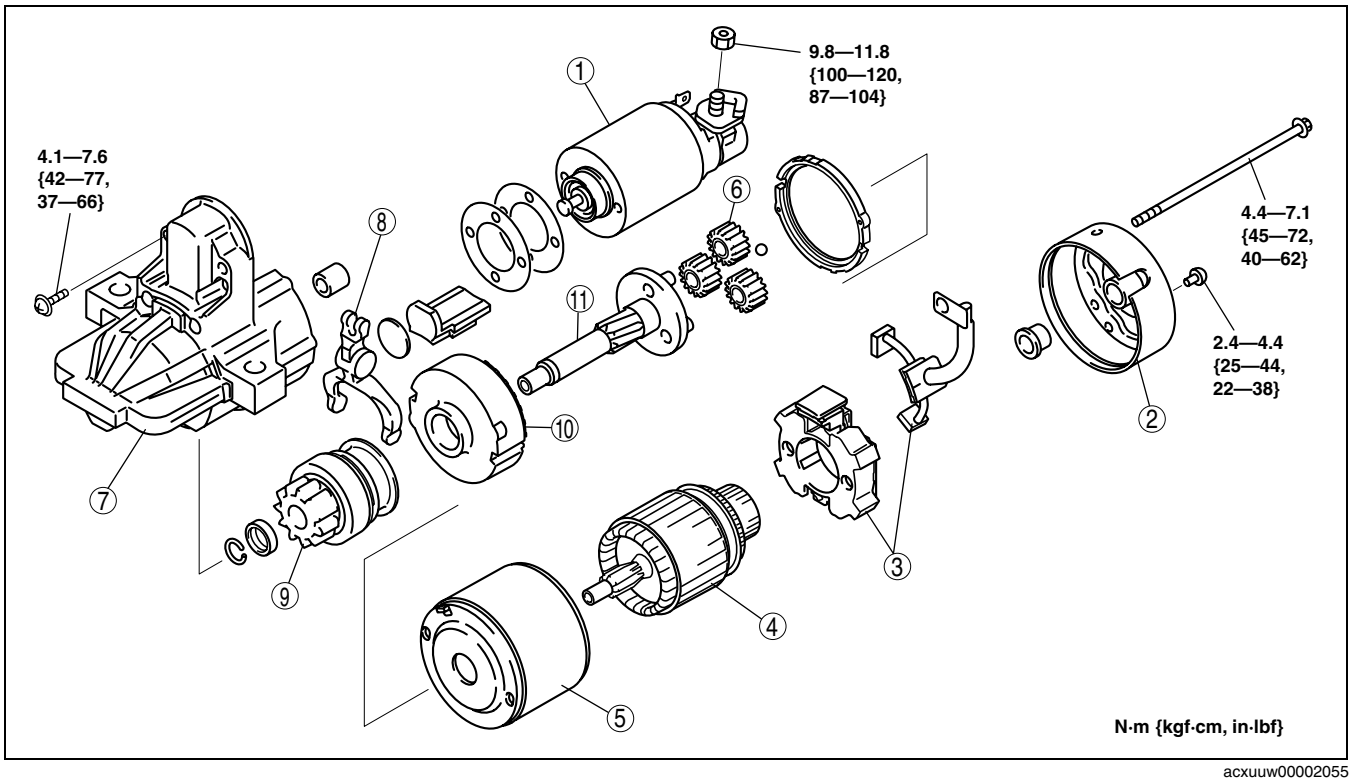
1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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| | |
|---|---|
| 1 | Magnetic switch |
| 2 | Rear housing |
| 3 | Brush and brush holder |
| 4 | Armature |
| 5 | Yoke |
| 6 | Planetary gear |

| | |
|---|---|
| 7 | Front cover |
| 8 | Lever |
| 9 | Drive pinion |
| 10 | Internal gear |
| 11 | Gear shaft |

# 01-20 CRUISE CONTROL SYSTEM [L3 WITH TC]

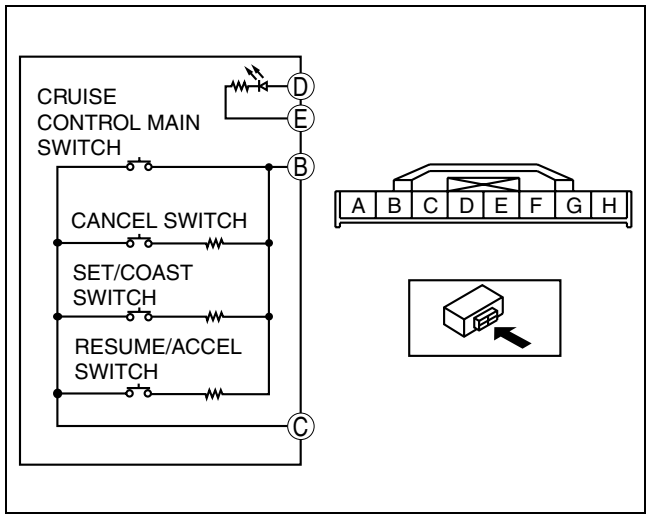
**CRUISE CONTROL SWITCH**
**INSPECTION[L3 WITH TC] . . . . . 01-20–1**



## CRUISE CONTROL SWITCH INSPECTION[L3 WITH TC]

id012039800100

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.)
3. Disconnect the cruise control switch connector.
4. Inspect for resistance and continuity between the cruise control switch terminals using an ohmmeter.
   - If not as specified, replace the cruise control switch.

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○—○: Continuity ○-ww-○: Resistance ○-▶|-○: Diode

| Switch position | Terminal | | | |
|---|---|---|---|---|
| | B | C | D | E |
| Cruise control main switch held at on | ○—○ | | ○-▶|-○ | |
| CANCEL switch held at on | ○-ww-○ $R_1$ | | ○-▶|-○ | |
| SET/COAST switch held at on | ○-ww-○ $R_2$ | | ○-▶|-○ | |
| RESUME/ACCEL switch held at on | ○-ww-○ $R_3$ | | ○-▶|-○ | |
| Neutral | | | ○-▶|-○ | |

$R_1$: 117.6—122.4 ohms $R_2$: 666.4—693.6 ohms
$R_3$: 2,156—2,244 ohms

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# 01-40 CONTROL SYSTEM [L3 WITH TC]

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## CONTROL SYSTEM COMPONENT LOCATION INDEX[L3 WITH TC]

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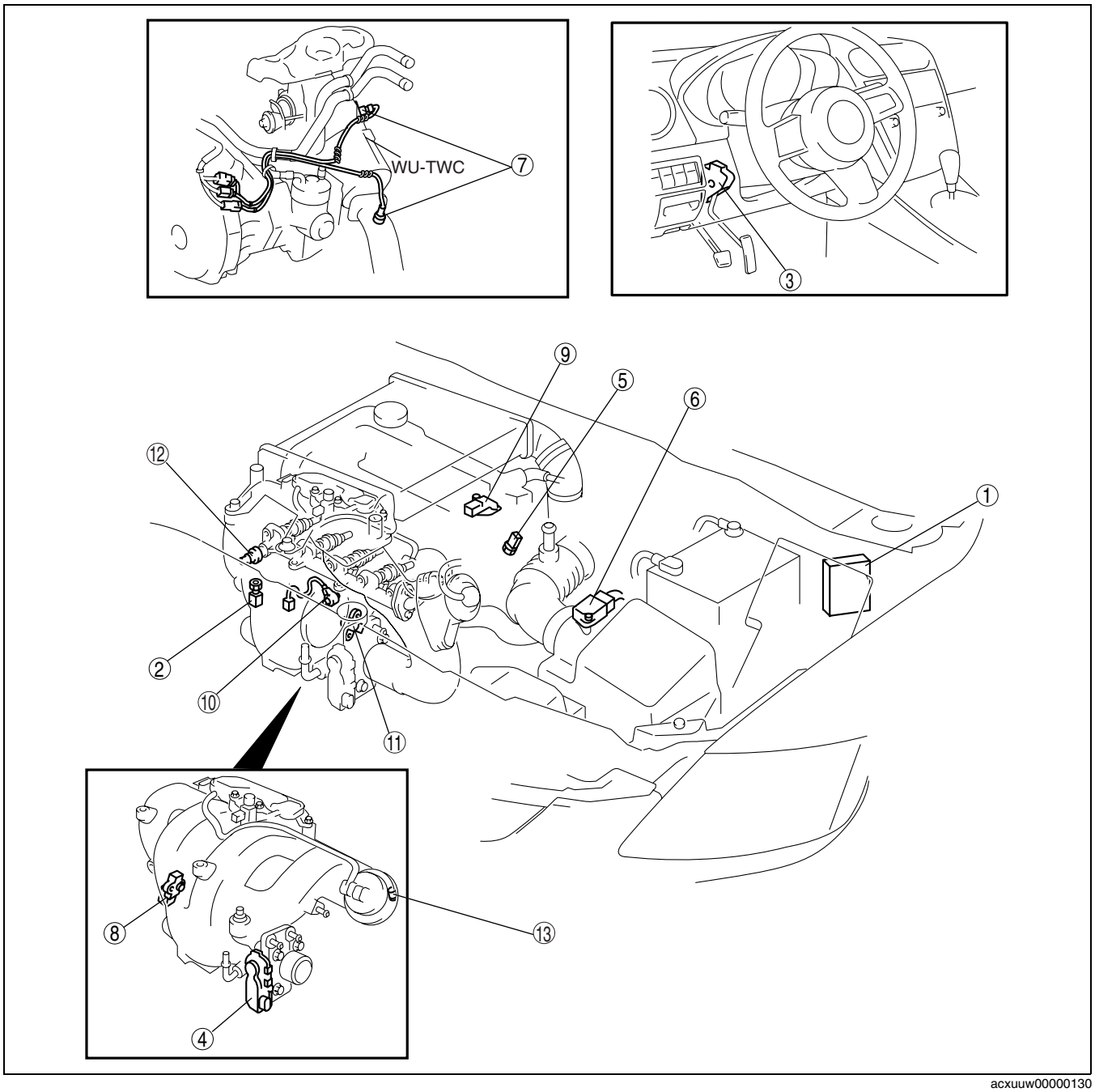


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| | |
|---|---|
| 1 | PCM (Built-in BARO sensor)<br>(See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-7 PCM terminal voltage table (Reference).)<br>(See01-40-21 PCM CONFIGURATION[L3 WITH TC].)<br>(See01-40-48 BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION[L3 WITH TC].) |
| 2 | PSP switch<br>(See01-40-22 POWER STEERING PRESSURE (PSP) SWITCH INSPECTION[L3 WITH TC].) |
| 3 | APP sensor<br>(See01-40-33 ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC].) |

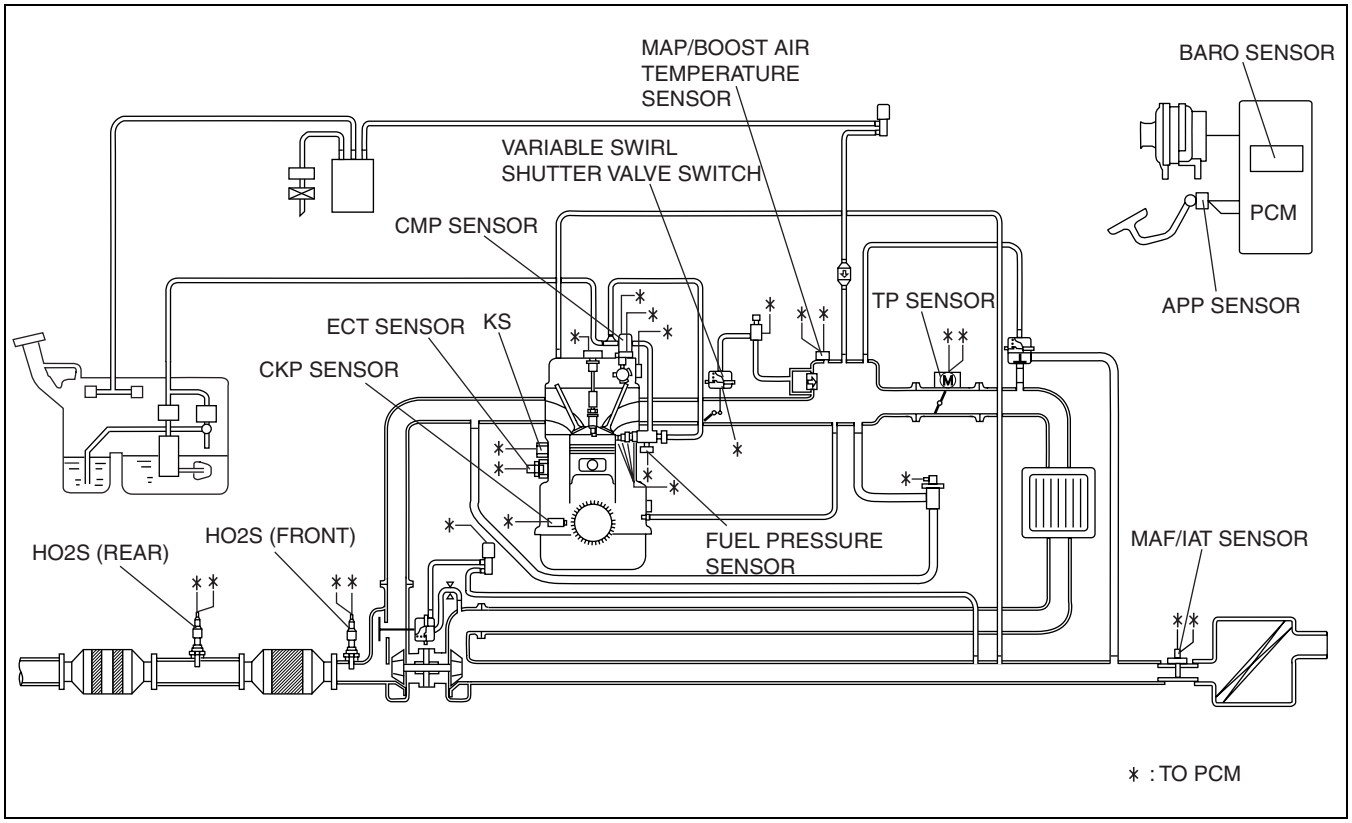
| | |
|---|---|
| 4 | TP sensor<br>(See01-40-32 THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC].) |
| 5 | ECT sensor<br>(See01-40-24 ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-25 ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC].) |
| 6 | MAF/IAT sensor<br>(See01-40-26 MASS AIR FLOW (MAF) SENSOR INSPECTION[L3 WITH TC].)<br>(See01-40-27 INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION[L3 WITH TC].) |

| | |
|---|---|
| 7 | HO2S<br>(See01-40-37 HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-37 HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC].) |
| 8 | MAP/boost air temperature sensor<br>(See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/BOOST AIR TEMPERATURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-29 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION[L3 WITH TC].)<br>(See01-40-31 BOOST AIR TEMPERATURE SENSOR INSPECTION[L3 WITH TC].) |
| 9 | CMP sensor<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-45 CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC].) |
| 10 | KS<br>(See01-40-47 KNOCK SENSOR (KS) REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-47 KNOCK SENSOR (KS) INSPECTION[L3 WITH TC].) |
| 11 | CKP sensor<br>(See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-43 CRANKSHAFT POSITION (CKP) SENSOR INSPECTION[L3 WITH TC].) |
| 12 | Fuel pressure sensor<br>(See01-40-35 FUEL PRESSURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See01-40-35 FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC].) |
| 13 | Variable swirl shutter valve switch<br>(See01-40-23 VARIABLE SWIRL SHUTTER VALVE SWITCH INSPECTION[L3 WITH TC].) |



### CONTROL SYSTEM DIAGRAM[L3 WITH TC]

id014039800300

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## CONTROL SYSTEM WIRING DIAGRAM[L3 WITH TC]

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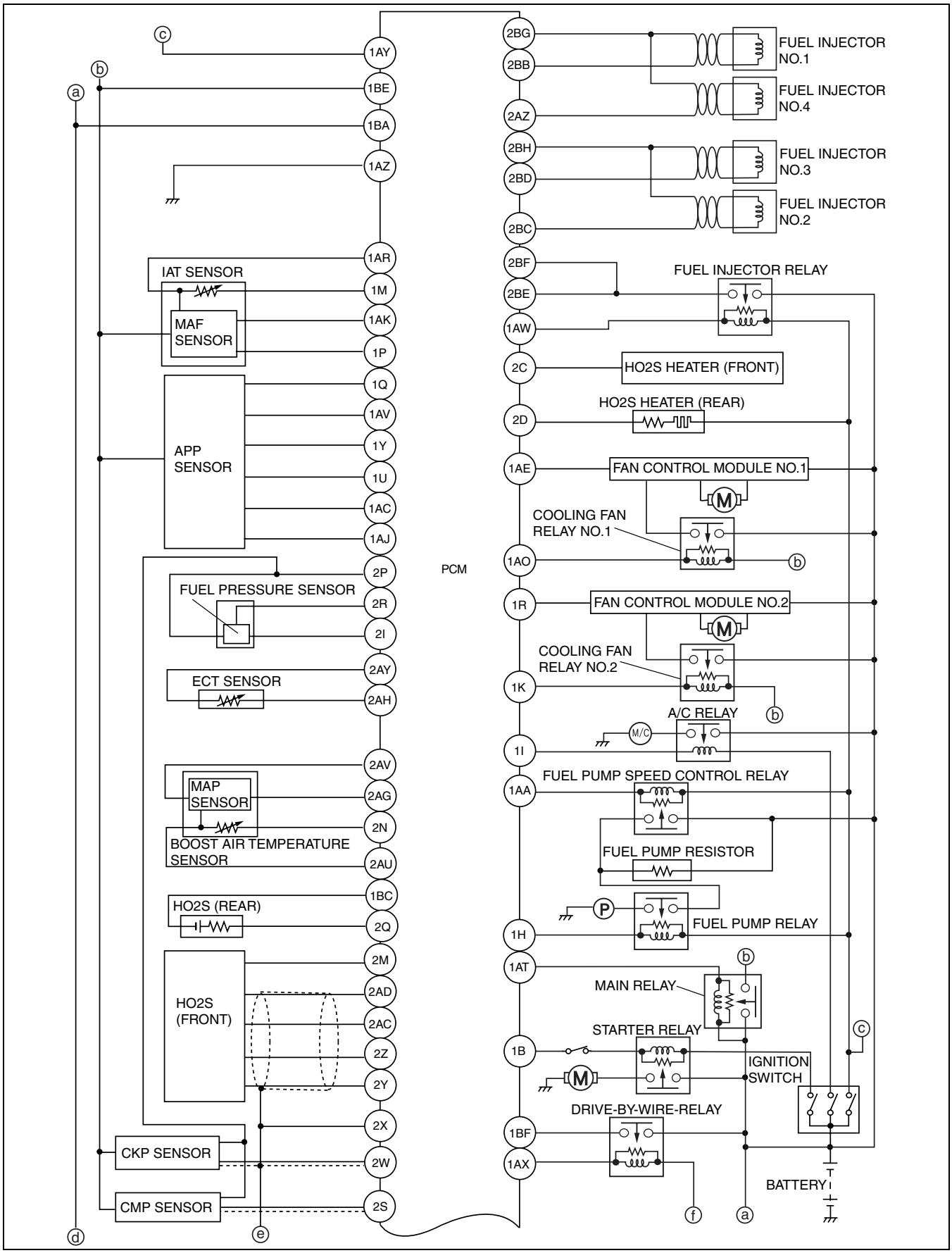


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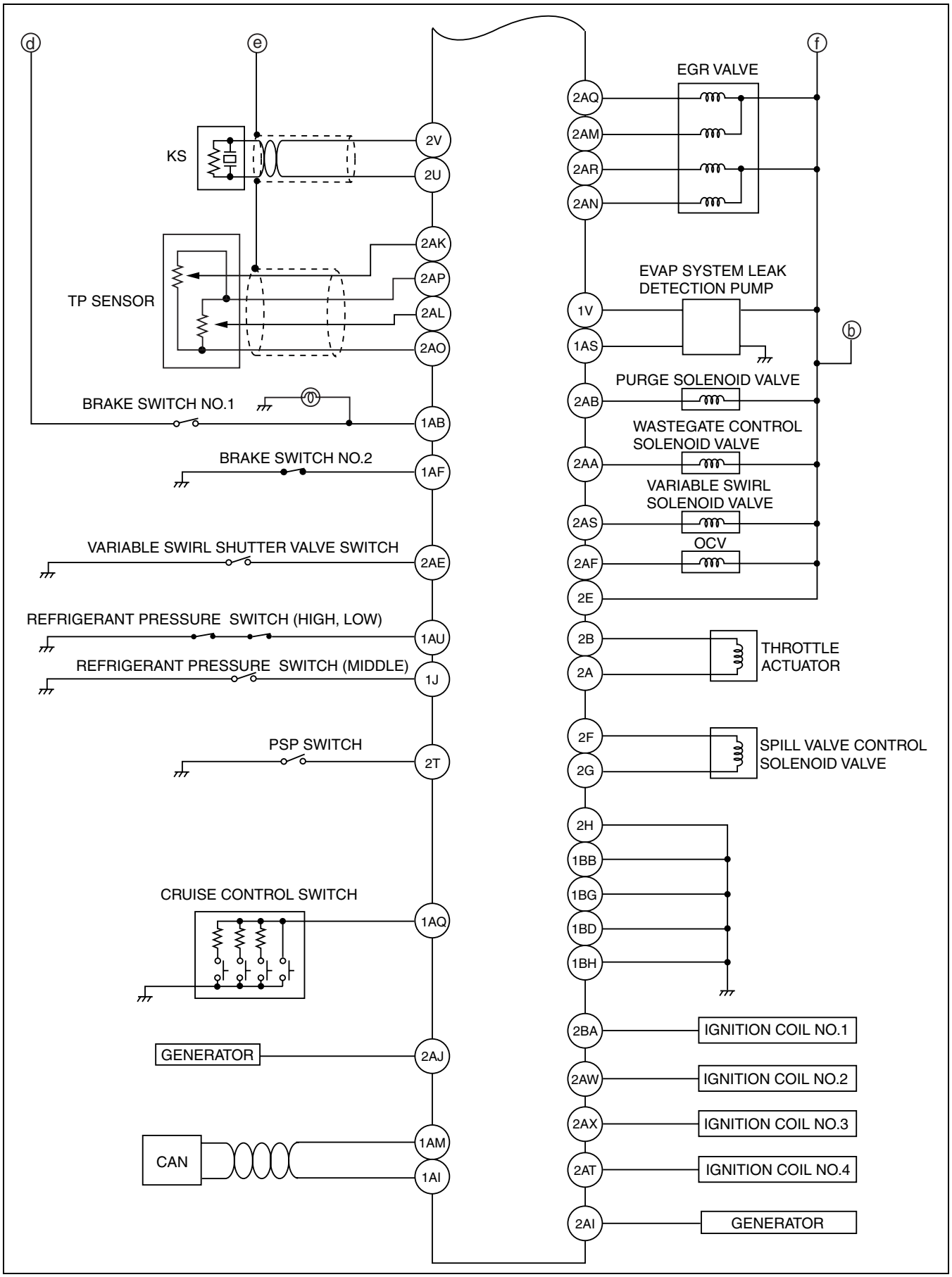
# CONTROL SYSTEM [L3 WITH TC]



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## PCM REMOVAL/INSTALLATION[L3 WITH TC]

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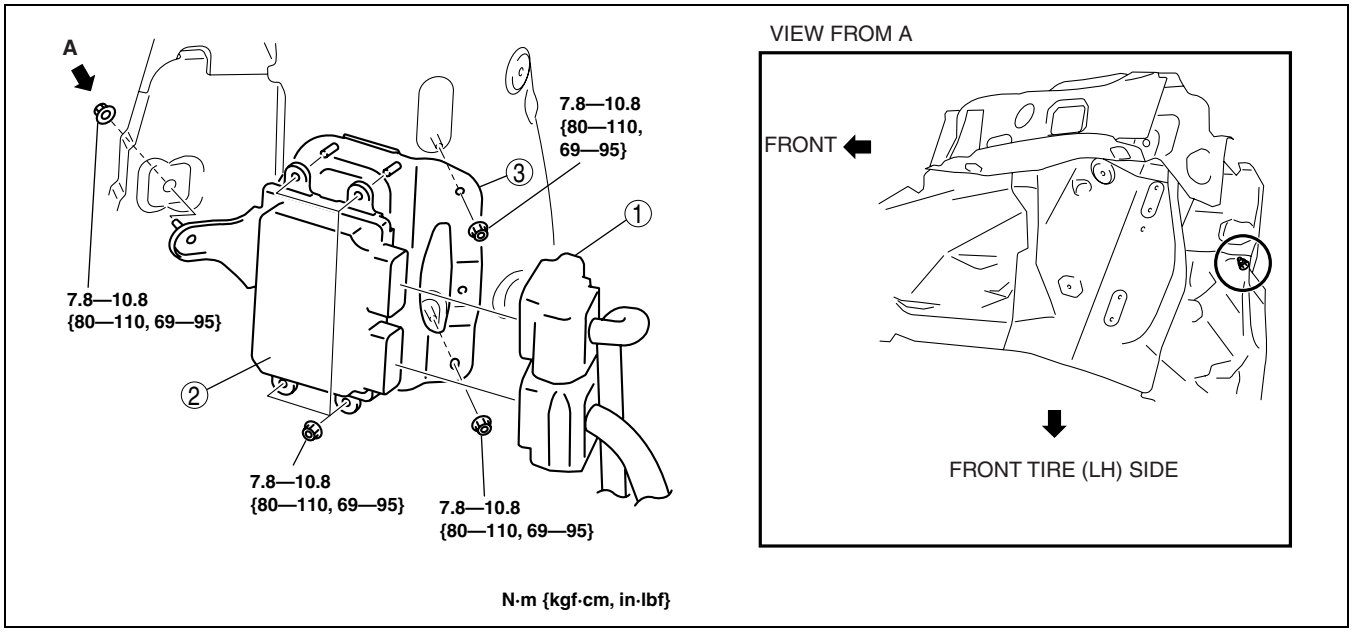
**Note**
- For PCM replacement, set up the M-MDS and perform the PCM configuration. (See 01-40-21 PCM CONFIGURATION[L3 WITH TC].)

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the Battery and battery tray. (See01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the mudguard (LH).
5. Remove in the order indicated in the table.
6. When replacing the PCM on the vehicles, perform the following.
   - PCM parameter reset (See09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) (See09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)
7. Install in the reverse order of removal.

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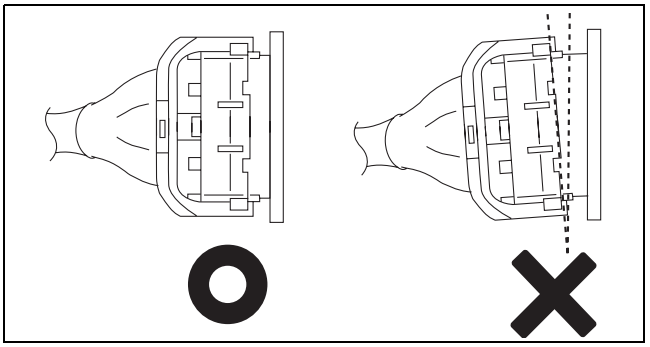
| | |
|---|---|
| 1 | PCM connector<br>(See 01-40-6 PCM Connector Connection Note.) |
| 2 | PCM |
| 3 | PCM bracket |

**PCM Connector Connection Note**

**Caution**
- **If the PCM connector is inserted at an angle and the lever is moved, the connector could be damaged. Verify that the PCM connector is inserted straight.**



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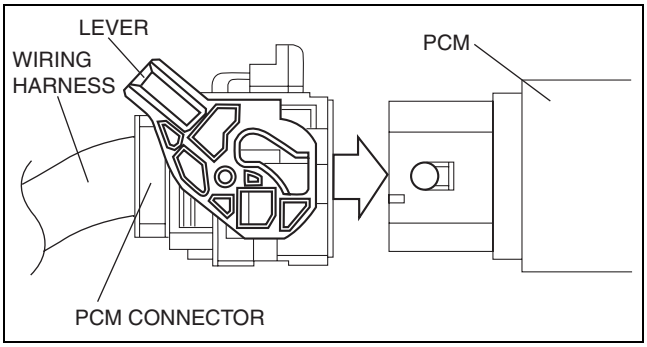
1. Verify that the PCM connector lever is tilted towards the wiring harness side as shown in the figure.
2. Insert the PCM connector straight until it contacts the PCM and verify that the lever reverts upward naturally.



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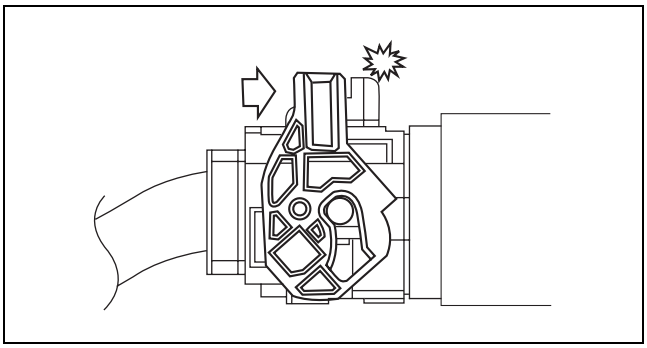
3. Push the lever until a click is heard.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**PCM INSPECTION[L3 WITH TC]**

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**Without Using the M-MDS**

**Note**

- The PCM terminal voltage can vary with the conditions when measuring and changes due to aged deterioration on the vehicle, causing false diagnosis. Therefore determine comprehensively where the malfunction occurs among the input systems, output systems, and the PCM.

**PCM inspection preparation**

1. Disconnect the negative battery cable.
2. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the windshield wiper arm and blade. (See09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
4. Remove the cowl grille. (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
5. Remove the windshield wiper motor. (See09-19-6 WINDSHIELD WASHER MOTOR REMOVAL/INSTALLATION.)
6. Remove the cowl panel. (See09-10-13 COWL PANEL REMOVAL/INSTALLATION.)
7. Remove the PCM bracket with the PCM connector still connected. (See01-40-6-1 Verify that the PCM connector lever is tilted towards the wiring harness side as shown in the figure..)
8. Connect the negative battery cable.

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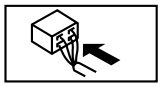
### PCM terminal voltage table (Reference)

PCM
WIRING HARNESS SIDE CONNECTOR

| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item |
|---|---|---|---|---|---|---|
| 1A | — | — | — | | — | — |
| 1B | Starter relay control | Starter relay | Ignition switch off after 10 s | | Below 1.0 | • Starter relay<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | Below 1.0 | |
| 1C | — | — | — | | — | — |
| 1D | — | — | — | | — | — |
| 1E | — | — | — | | — | — |
| 1F | — | — | — | | — | — |
| 1G | — | — | — | | — | — |
| 1H | Fuel pump control | Fuel pump relay | Ignition switch to the ON position after 10 s | | B+ | • Fuel pump relay<br>• Related wiring harness |
| | | | Cranking | | B+ | |
| | | | Idle | | Below 1.0 | |
| 1I | A/C | A/C relay | Idle | A/C operating | Below 1.0 | • A/C relay<br>• Related wiring harness |
| | | | | A/C not operating | B+ | |
| 1J | Refrigerant pressure switch (middle) | Refrigerant pressure switch (middle) | A/C ON | Refrigerant pressure is more than the specification. (Refrigerant pressure switch (middle) is on.) | Below 1.0 | • Refrigerant pressure switch<br>• Related wiring harness |
| | | | | Refrigerant pressure is less than the specification. (Refrigerant pressure switch (middle) is off.) | B+ | |
| 1K | — | — | — | | — | — |
| 1L | — | — | — | | — | — |
| 1M | IAT | MAF/IAT sensor | Ignition switch to the ON position | IAT 20 °C {68 °F} | 2.4—2.6 | • MAF/IAT sensor<br>• Related wiring harness |
| | | | | IAT 30 °C {86 °F} | 1.7—1.9 | |
| 1N | — | — | — | | — | — |
| 1O | — | — | — | | — | — |
| 1P | MAF sensor ground | MAF/IAT sensor | Under any condition | | Below 1.0 | • Related wiring harness |
| 1Q | APP sensor voltage | APP sensor | Ignition switch to the ON position | | Approx. 5.0 | • Related wiring harness<br>• APP sensor |

| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item |
|---|---|---|---|---|---|---|
| 1R | Fan control module (No.2) | Fan control module No.2 | Fan not operate | | Below 1.0 | • Fan control module No.2<br>• Related wiring harness |
| | | | Fan operates | | Approx. 3.5 | |
| 1S | — | — | — | | — | — |
| 1T | — | — | — | | — | — |
| 1U | APP sensor ground | APP sensor | Under any condition | | Below 1.0 | • Related wiring harness<br>• APP sensor |
| 1V | EVAP leak detection pump (solenoid) | EVAP leak detection pump | Ignition switch to the ON position | | B+ | • EVAP leak detection pump<br>• Related wiring harness |
| 1W | — | — | — | | — | — |
| 1X | — | — | — | | — | — |
| 1Y | APP sensor (No.1) | APP sensor | Ignition switch to the ON position | When the accelerator pedal is released | 1.56—1.65 | • APP sensor<br>• Related wiring harness |
| | | | | When the accelerator pedal is depressed | 3.65—3.93 | |
| 1Z | — | — | — | | — | — |
| 1AA | Fuel pump control | Fuel pump relay | Ignition switch to the ON position after 10 s | | B+ | • Fuel pump relay<br>• Related wiring harness |
| | | | Cranking | | Below 1.0 | |
| | | | Idle | | Below 1.0 | |
| 1AB | Brake (No.1) | Brake switch No.1 | Brake pedal depressed | | B+ | • Brake switch No.1<br>• Related wiring harness |
| | | | Brake pedal released | | Below 1.0 | |
| 1AC | APP sensor (No.2) | APP sensor (No.2) | Ignition switch to the ON position | When the accelerator pedal is released | 1.01—1.10 | • APP sensor<br>• Related wiring harness |
| | | | | When the accelerator pedal is depressed | 3.10—3.38 | |
| 1AD | — | — | — | | — | — |
| 1AE | Fan control module (No.1) | Fan control module No.1 | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Fan control module No.1<br>• Related wiring harness |
| 1AF | Brake (No.2) | Brake switch No.2 | Brake pedal depressed | | B+ | • Brake switch No.2<br>• Related wiring harness |
| | | | Brake pedal released | | Below 1.0 | |
| 1AG | — | — | — | | — | — |
| 1AH | — | — | — | | — | — |
| 1AI | CAN (L) | CAN related module | Because this terminal is for CAN, no valid determination of terminal voltage is possible | | | • Related wiring harness |
| 1AJ | Constant voltage | APP sensor | Ignition switch to the ON position | | Approx. 5.0 | • Related wiring harness |
| 1AK | MAF | MAF/IAT sensor | Ignition switch to the ON position | | Approx. 0.7 | • MAF/IAT sensor<br>• Related wiring harness |
| | | | Idle | | Approx. 1.3 | |
| 1AL | — | — | — | | — | — |
| 1AM | CAN (H) | CAN related module | Because this terminal is for CAN, no valid determination of terminal voltage is possible | | | • Related wiring harness |
| 1AN | — | — | — | | — | — |

| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item |
|---|---|---|---|---|---|---|
| 1AO | — | — | — | | — | — |
| 1AP | — | — | — | | — | — |
| 1AQ | Cruise control switch | Cruise control switch | Ignition switch to the ON position | ON/OFF switch pressed in | Approx. 0 | • Cruise control switch<br>• Related wiring harness |
| | | | | CANCEL switch pressed in | Approx. 1.1 | |
| | | | | SET/COAST switch pressed in | Approx. 3.1 | |
| | | | | RES/ACCEL switch pressed in | Approx. 4.2 | |
| | | | | Except above | Approx. 5.0 | |
| 1AR | IAT sensor ground | MAF/IAT sensor | Under any condition | | Below 1.0 | • Related wiring harness |
| 1AS | EVAP leak detection pump (pump) | EVAP leak detection pump | Ignition switch to the ON position | | Below 1.0 | • EVAP leak detection pump<br>• Related wiring harness |
| | | | Idling | | B+ | |
| 1AT | Main relay control | Main relay | Ignition switch off after 10 s | | B+ | • Main relay<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | Below 1.0 | |
| 1AU | A/C on signal | Refrigerant pressure switch (high, low) | Idle | A/C switch and fan switch on | B+ | • Refrigerant pressure switch (high, low)<br>• Related wiring harness |
| 1AV | APP sensor ground | APP sensor | Under any condition | | Below 1.0 | • Related wiring harness |
| 1AW | Injector control | Fuel Injector relay | Under any condition | | Below 1.0 | • Related wiring harness |
| 1AX | Drive-by-wire relay | Drive-by-wire relay | Ignition switch off after 10 s | | B+ | • Related wiring harness |
| | | | Ignition switch to the ON position | | Below 1.0 | |
| 1AY | Ignition switch | Ignition switch | Ignition switch off | | Below 1.0 | • Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |
| 1AZ | Ground | Ground | Under any condition | | Below 1.0 | • Related wiring harness |
| 1BA | Back-up power supply | Battery (positive terminal) | Under any condition | | B+ | • Battery<br>• Related wiring harness |
| 1BB | Ground | Ground | Under any condition | | Below 1.0 | • Related wiring harness |
| 1BC | Sensor ground | HO2S (rear) | Under any condition | | Below 1.0 | • HO2S (rear)<br>• Related wiring harness |
| 1BD | Ground | Ground | Under any condition | | Below 1.0 | • Related wiring harness |
| 1BE | B+ | Main relay | Ignition switch off after 10 s | | Below 1.0 | • Battery<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |
| 1BF | Drive-by-wire relay | Drive-by-wire relay | Ignition switch off after 10 s | | Below 1.0 | • Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |
| 1BG | Ground | Ground | Under any condition | | Below 1.0 | • Related wiring harness |
| 1BH | Ground | Ground | Under any condition | | Below 1.0 | • Related wiring harness |
| 2A | Throttle actuator control (+) | Throttle body | Ignition switch off | | Approx. 1.5 | • Throttle actuator<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |

| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item |
|---|---|---|---|---|---|---|
| 2B | Throttle actuator control (–) | Throttle body | Ignition switch off | | Approx. 1.5 | • Throttle actuator<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |
| 2C | HO2S (front) heater control | HO2S (front) heater | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • HO2S (front)<br>• Related wiring harness |
| 2D | HO2S (rear) heater control | HO2S (rear) heater | • Engine speed above 5,000 rpm (Heater control not operating) | | B+ | • HO2S (rear) heater<br>• Related wiring harness |
| 2E | Variable swirl solenoid valve power supply | Main relay, variable swirl solenoid valve, CMP sensor | Ignition switch off after 10 s | | Below 1.0 | • Main relay<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |
| 2F | High pressure fuel pump control (+) | High pressure fuel pump | Ignition switch off | | Below 1.0 | • High pressure fuel pump<br>• Related wiring harness Related wiring harness |
| | | | Ignition switch to the ON position | | Approx. 9.7 | |
| | | | Idle | | Approx. 9.4 | |
| 2G | High pressure fuel pump control (–) | High pressure fuel pump | Ignition switch off | | Below 1.0 | • High pressure fuel pump<br>• Related wiring harness Related wiring harness |
| | | | Ignition switch to the ON position | | Approx. 9.6 | |
| | | | Idle | | Approx. 8.6 | |
| 2H | Ground | Body ground | Under any condition | | Below 1.0 | • Related wiring harness |
| 2I | Constant voltage (Vref) | Fuel pressure sensor | Ignition switch to the ON position | | Approx. 5.0 | • Related wiring harness |
| 2J | — | — | — | | — | — |
| 2K | — | — | — | | — | — |
| 2L | — | — | — | | — | — |
| 2M | Sensor ground | HO2S (front) | Under any condition | | Below 1.0 | • Related wiring harness |
| 2N | Boost air temperature | MAP/Boost air temperature sensor | Ignition switch to the ON position | IAT 20 °C {68 °F} | 2.4—2.6 | • Boost air temperature sensor<br>• Related wiring harness |
| | | | | IAT 30 °C {86 °F} | 1.7—1.9 | |
| 2O | — | — | — | | — | — |
| 2P | Sensor ground | Fuel pressure sensor | Under any condition | | Below 1.0 | • Fuel pressure sensor<br>• Related wiring harness |
| 2Q | HO2S (rear) | HO2S (rear) | Idle | | 0—1 | • HO2S (rear)<br>• Related wiring harness |
| 2R | Fuel pressure sensor | Fuel pressure sensor | Ignition switch off | | Below 1.0 | • Fuel pressure sensor<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | Approx. 1.1 | |
| | | | Idle | | Approx. 1.7 | |
| 2S | CMP | CMP sensor | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • CMP sensor<br>• Related wiring harness |
| 2T | PSP | PSP switch | Idle | Steering wheel at straight ahead position | B+ | • PSP switch<br>• Power steering system<br>• Related wiring harness |
| | | | | While turning steering wheel | Below 1.0 | |

| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item |
|---|---|---|---|---|---|---|
| 2U | Knocking (+) | KS | Ignition switch to the ON position (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter) | | Approx. 4.3 | • KS<br>• Related wiring harness |
| 2V | Knocking (–) | KS | Ignition switch to the ON position (Use digital type voltmeter, because measurement voltage will be detected less than true voltage when using analog type voltmeter) | | Below 1.0 | • KS<br>• Related wiring harness |
| 2W | CKP | CKP sensor | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • CKP sensor<br>• Related wiring harness |
| 2X | Internal ground | KS, CMP sensor, CKP sensor, HO2S (Front), Variable swirl solenoid valve, TP sensor | Under any condition | | Below 1.0 | • Related wiring harness |
| 2Y | HO2S (front) calibration resistor | HO2S (front) | Ignition switch off after 10s | | Below 1.0 | • HO2S (front)<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | Approx. 3.9 | |
| 2Z | HO2S (front) power supply | HO2S (front) | Idle (after warm up) | | Approx. 6.2 | • HO2S (front)<br>• Related wiring harness |
| 2AA | Wastegate control solenoid valve | Wastegate control solenoid valve | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Wastegate control solenoid valve<br>• Related wiring harness |
| 2AB | Purge solenoid valve | Purge solenoid valve | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Purge solenoid valve<br>• Related wiring harness |
| 2AC | HO2S (front) VSIP | HO2S (front) | Idle (after warm up) | | Approx. 3.7 | • HO2S (front)<br>• Related wiring harness |
| 2AD | HO2S (front) IP+ | HO2S (front) | Idle (after warm up) | | Approx. 3.7 | • HO2S (front)<br>• Related wiring harness |
| | | | After racing | | 2.1—4.8 | |
| 2AE | Variable swirl shutter valve monitor | Variable swirl shutter valve switch | variable swirl shutter valve close | | Below 1.0 | • Variable swirl shutter valve switch<br>• Related wiring harness |
| | | | variable swirl shutter valve open | | B+ | |
| 2AF | OCV control | OCV | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • OCV valve<br>• Related wiring harness |
| 2AG | Manifold absolute pressure | MAP sensor | Ignition switch to the ON position) | | Approx. 1.9 | • MAP sensor<br>• Related wiring harness |
| | | | Idle (after warm up) | | Below 1.0 | |
| 2AH | ECT | ECT sensor | Ignition switch to the ON position | ECT 20 °C {68 °F} | 3.04—3.14 | • ECT sensor<br>• Related wiring harness |
| | | | | ECT 60 °C {140 °F} | 1.29—1.39 | |
| 2AI | Generator field coil control | Generator (terminal D) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Generator<br>• Related wiring harness |
| 2AJ | Generator output voltage | Generator (terminal P) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Generator<br>• Related wiring harness |

| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item |
|---|---|---|---|---|---|---|
| 2AK | TP sensor (No. 1) | TP sensor (No. 1) | Ignition switch to the ON position | APP is released | 0.4—0.6 | • TP sensor<br>• Related wiring harness |
| | | | | APP is depressed | 4.7—4.9 | |
| 2AL | TP sensor (No. 2) | TP sensor (No. 2) | Ignition switch to the ON position | APP is released | 4.4—4.6 | • TP sensor<br>• Related wiring harness |
| | | | | APP is depressed | 0.1—0.3 | |
| 2AM | EGR valve #3 coil control | EGR valve (terminal A) | Ignition switch to the ON position | | B+ | • EGR valve<br>• Related wiring harness |
| | | | Ignition switch off | | Below 1.0 | |
| 2AN | EGR valve #6 coil control | EGR valve (terminal F) | Ignition switch to the ON position | | B+ | • EGR valve<br>• Related wiring harness |
| | | | Idle | | B+ | |
| 2AO | Constant voltage (Vref) | TP sensor | Ignition switch to the ON position | | Approx. 5.0 | • TP sensor<br>• Related wiring harness |
| 2AP | TP sensor Ground | TP sensor | Under any condition | | Below 1.0 | • TP sensor<br>• Related wiring harness |
| 2AQ | EGR valve #1 coil control | EGR valve (terminal E) | Ignition switch to the ON position | | Below 1.0 | • EGR valve<br>• Related wiring harness |
| | | | Idle | | Below 1.0 | |
| 2AR | EGR valve #4 coil control | EGR valve (terminal B) | Ignition switch to the ON position | | B+ | • EGR valve<br>• Related wiring harness |
| | | | Ignition switch off | | Below 1.0 | |
| 2AS | Variable swirl control | Variable swirl solenoid valve | ECT 62 °C {144 °F} or more and engine speed 3,250 rpm or more | | B+ | • Variable swirl solenoid valve<br>• Related wiring harness |
| | | | ECT less than 62 °C {144 °F} and engine speed less than3,250 rpm | | Below 1.0 | |
| 2AT | IGT4 | Ignition coil (No.4 cylinders) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Ignition coil No.4<br>• Related wiring harness |
| 2AU | Constant voltage (Vref) | MAP sensor | Ignition switch to the ON position | | Approx. 5.0 | • Related wiring harness |
| 2AV | Sensor ground | MAP sensor | Under any condition | | Below 1.0 | • Related wiring harness |
| 2AW | IGT2 | Ignition coil (No.2 cylinders) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Ignition coil No.2<br>• Related wiring harness |
| 2AX | IGT3 | Ignition coil (No.3 cylinders) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Ignition coil No.3<br>• Related wiring harness |
| 2AY | Sensor ground | ECT sensor | Under any condition | | Below 1.0 | • ECT sensor<br>• Related wiring harness |
| 2AZ | Fuel injection (–)(#4) | Fuel injector (No.4) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Fuel injector No.4<br>• Related wiring harness |
| 2BA | IGT1 | Ignition coil (No.1 cylinders) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Ignition coil No.1<br>• Related wiring harness |
| 2BB | Fuel injection (–)(#1) | Fuel injector (No.1) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Fuel injector No.1<br>• Related wiring harness |
| 2BC | Fuel injection (–)(#2) | Fuel injector (No.2) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Fuel injector No.2<br>• Related wiring harness |
| 2BD | Fuel injection (–)(#3) | Fuel injector (No.3) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | | • Fuel injector No.3<br>• Related wiring harness |
| 2BE | Fuel injector power supply 1 | Fuel Injector relay | Ignition switch off | | Below 1.0 | • Fuel Injector relay<br>• Related wiring harness |
| | | | Ignition switch to the ON position | | B+ | |

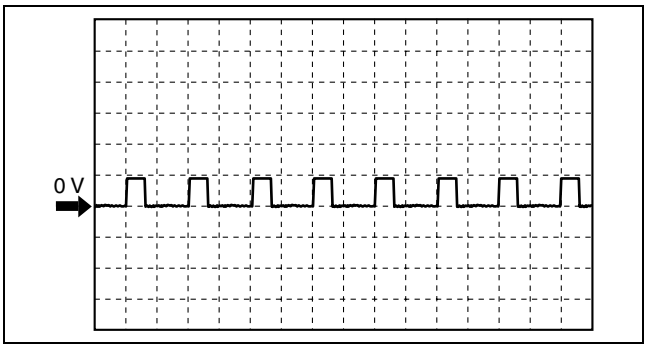
| Terminal | Signal | Connected to | Test condition | Voltage (V) | Inspection item |
|---|---|---|---|---|---|
| 2BF | Fuel injector power supply 2 | Fuel Injector relay | Ignition switch off | Below 1.0 | • Fuel Injector relay<br>• Related wiring harness |
| | | | Ignition switch to the ON position | B+ | |
| 2BG | Fuel injection (+)(#1, #4) | Fuel injector (No.1,No.4) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | • Fuel injector No.1, No.4<br>• Related wiring harness |
| 2BH | Fuel injection (+)(#2, #3) | Fuel injector (No.2, No.3) | • Inspect using the wave profile. (See01-40-6 PCM inspection preparation.) | | • Fuel injector No.2, No.3<br>• Related wiring harness |



**Inspection Using An Oscilloscope (Reference)**
**Fan control module (No.1) signal**
**PCM terminals**
- 1AE (+)— body ground (–)

**Oscilloscope setting**
- 5 V/DIV (Y), 20 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

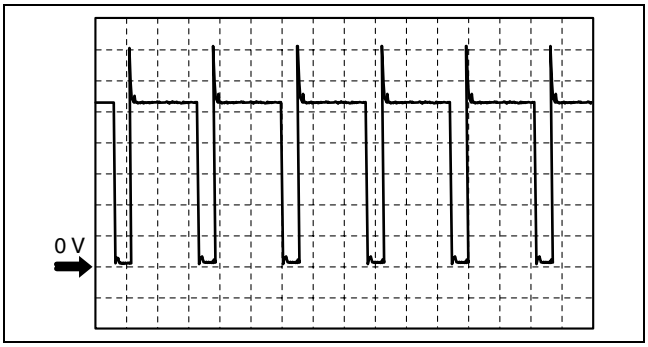


acxuuw00000274

**HO2S (front) heater control signal**
**PCM terminals**
- 2C (+)— body ground (–)

**Oscilloscope setting**
- 2 V/DIV (Y), 20 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

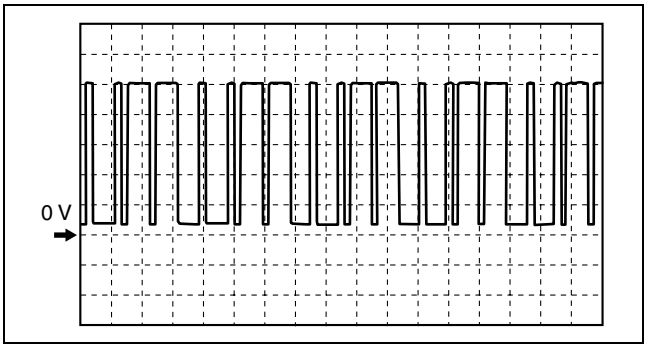


acxuuw00000275

**CMP sensor signal**
**PCM terminals**
- 2S (+)— body ground (–)

**Oscilloscope setting**
- 2 V/DIV (Y), 100 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

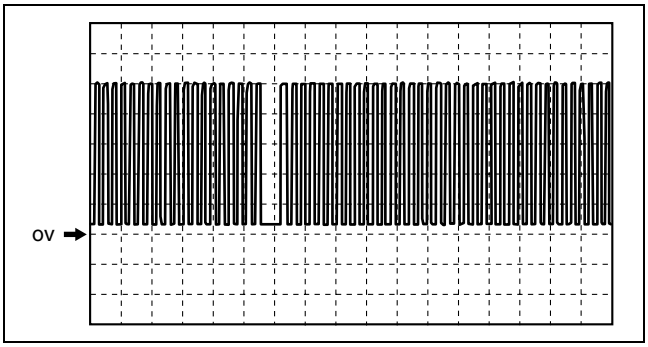


acxuuw00000127

**CKP sensor signal**
**PCM terminals**
- 2W (+)— body ground (–)

**Oscilloscope setting**
- 2 V/DIV (Y), 5 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

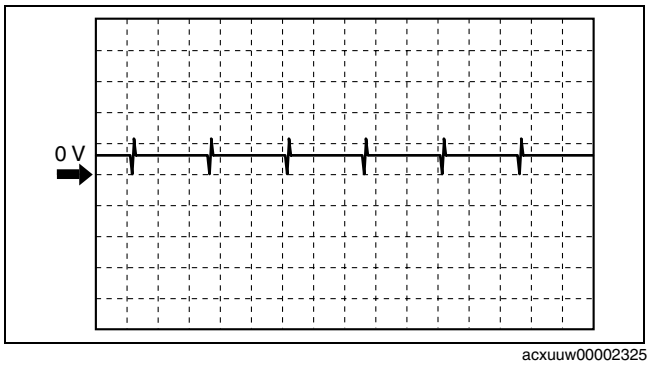


acxuuw00000128

**Wastegate control solenoid valve signal**
**PCM terminals**
- 2AA (+)— body ground (–)

**Oscilloscope setting**
- 20 V/DIV (Y), 20 ms/DIV (X), DC range

**Vehicle condition**
- Ignition switch to the ON position

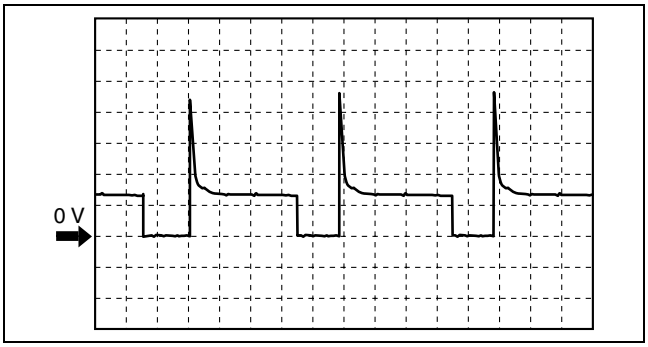


acxuuw00002325

**Purge control signal**
**PCM terminals**
- 2AB (+)— body ground (–)

**Oscilloscope setting**
- 10 V/DIV (Y), 20 ms/DIV (X), DC range

**Vehicle condition**
- Engine speed is 2,000 rpm

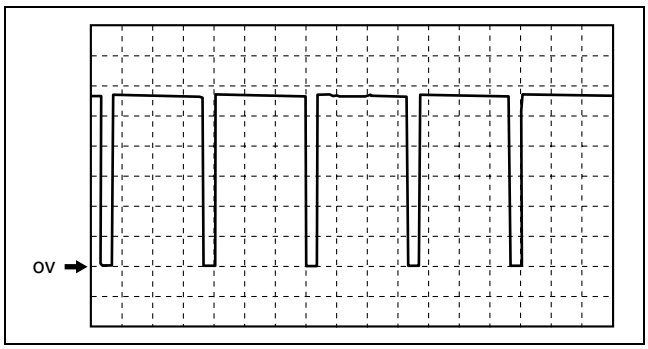


ampjjw00001527

**OCV signal**
**PCM terminals**
- 2AF (+)— body ground (–)

**Oscilloscope setting**
- 2.5 V/DIV (Y), 1 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

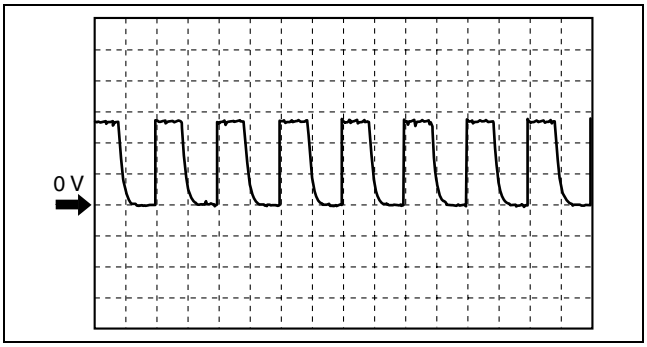


acxuuw00000129

**Generator field coil control signal**
**PCM terminals**
- 2AI (+)— body ground (–)

**Oscilloscope setting**
- 0.5 V/DIV (Y), 2 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (engine speed approx. 650 rpm, no load)

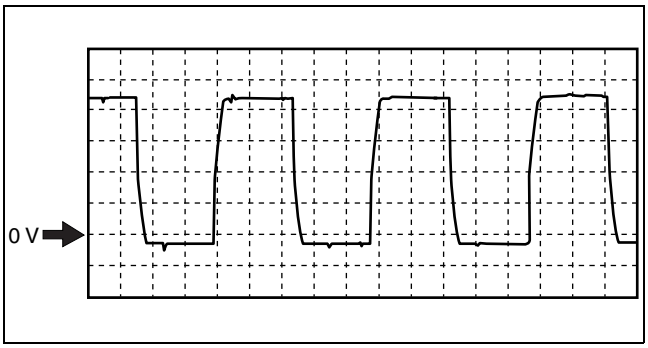


ampjjw00001528

**Generator output voltage signal**
**PCM terminals**
- 2AJ (+)— body ground (–)

**Oscilloscope setting**
- 2 V/DIV (Y),1 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

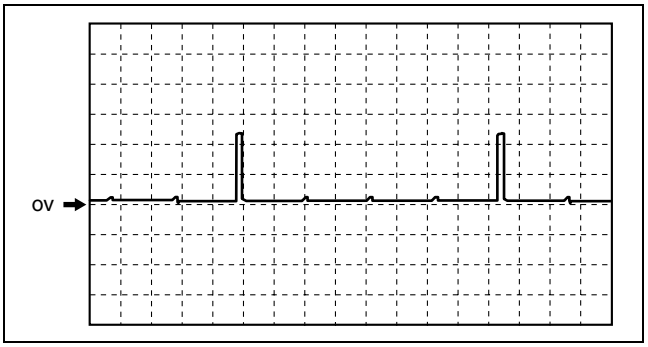


ampjjw00001529

**IGT1, IGT2, IGT3, IGT4 control signals**
**PCM terminals**
- IGT1 (No.1): 2BA (+)— body ground (–)
- IGT2 (No.2): 2AW (+)— body ground (–)
- IGT3 (No.3): 2AX (+)— body ground (–)
- IGT4 (No.4): 2AT (+)— body ground (–)

**Oscilloscope setting**
- 2 V/DIV (Y), 20 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

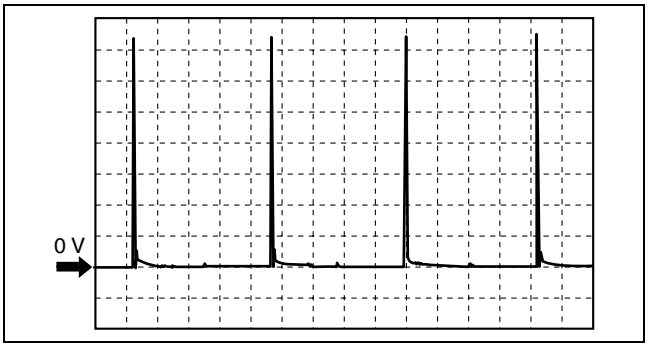


ampjjw00000781

**Fuel injection control (–)**
**PCM terminals**
- Fuel injection No.1: 2BB (+)— body ground (–)
- Fuel injection No.2: 2BC (+)— body ground (–)
- Fuel injection No.3: 2BD (+)— body ground (–)
- Fuel injection No.4: 2AZ (+)— body ground (–)

**Oscilloscope setting**
- 10 V/DIV (Y), 20 ms/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

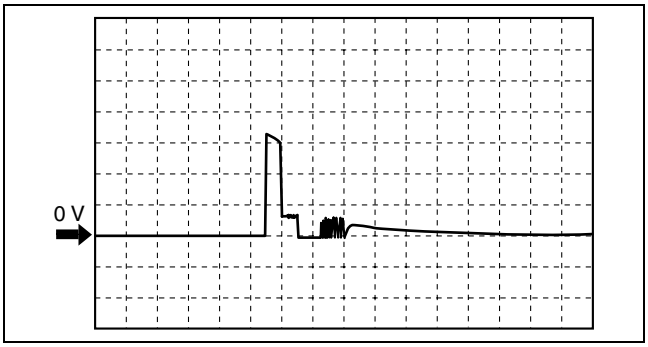


acxuuw00002326

**Fuel injection control (+)**
**PCM terminals**
- Fuel injection No.1, No.4: 2BG (+)— body ground (–)
- Fuel injection No.2, No.3: 2BH (+)— body ground (–)

**Oscilloscope setting**
- 20 V/DIV (Y), 400 μs/DIV (X), DC range

**Vehicle condition**
- Idle after warm up (no load, P/S off, A/C off)

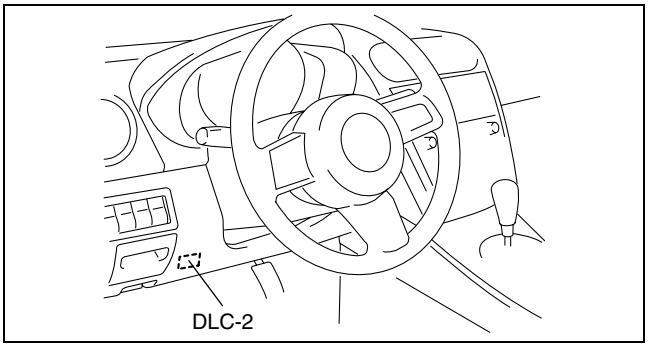


acxuuw00000277

**Using the M-MDS**

**Note**
- PIDs for the following parts are not available on this model. Perform the specific inspections for the following parts:
  — CMP sensor (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC].)
  — Main relay

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Measure the PID value.
   - If PID value is not within the specification, follow the instructions in the “Inspection item“ column.



acxuuw00000278

**Note**
- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the PCM. Therefore, an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device. If a monitored value of an output device is out of specification, inspect the monitored value of the input device related to the output control.
- For input/output signals except those of the monitoring items, use a voltmeter to measure the PCM terminal voltage.
- The simulation items that are used in the ENGINE CONTROL SYSTEM OPERATION INSPECTION are as follows.
  — ACCS, ALTF, ARPMDES, FAN_DUTY, EVAPCP, FP, FUELPW, GENVDSD, HTR11, HTR12, IMRC, INJ_1, INJ_2, INJ_3, INJ_4, SEGRP, test, VT DUTY1, WGC

**PID/DATA monitor table (reference)**

| Monitor item (Definition) | Unit/ Condition | Condition/Specification (Reference) | Inspection item | PCM terminal |
|---|---|---|---|---|
| AAT (Ambient air temperature) | °C °F | Ignition switch to the ON position: Indicate the ambient air temperature | • MAF/IAT sensor | 1M |
| AC_REQ (Refrigerant pressure switch (high, low)) | On/Off | Refrigerant pressure is more than the specification or less than the specification. (Refrigerant pressure switch (high, low) is off.): Off<br>Except above: On | • Refrigerant pressure switch (high, low) | 1AU |
| ACCS (A/C relay) | On/Off | A/C relay is ON: On<br>A/C relay is OFF: Off | • The following PIDs:<br>— RPM, TP, ECT<br>• A/C relay | 1I |
| AFR (Air/fuel ratio) | — | Target air-oil ratio is displayed | • HO2S | 2Q<br>2Z<br>2AC<br>2AD |
| AFR_ACT (Actual air/ fuel ratio) | — | Actual air-oil ratio is displayed | • HO2S | 2Q<br>2Z<br>2AC<br>2AD |
| ALTF (Generator field coil control duty value) | % | Ignition switch to the ON position: 0%<br>Idle: 0— 100%<br>Just after A/C switch ON and fan switch ON at idle: Duty value rises | • The following PIDs:<br>— IAT, ECT, RPM, VPWR, ALTT V<br>• Generator | 2AI |
| ALTT V (Generator output voltage) | V | Idle (no E/L): Approx. 14 V (This is an internal calculation value and differs from the terminal voltage.) | • Generator | 2AJ |
| APP (Accelerator pedal position) | % | Accelerator pedal is released: 0%<br>Accelerator pedal is depressed: 100% | • The following PIDs:<br>— APP1, APP2<br>• APP sensor | 1Y<br>1AC |
| APP1 (Accelerator pedal position) | % | Accelerator pedal is released: 31.0— 32.4%<br>Accelerator pedal is depressed: 69.8— 81.8% | • APP sensor | 1Y |
| | V | Accelerator pedal is released: 1.56— 1.65 V<br>Accelerator pedal is depressed: 3.65— 3.93 V | | |
| APP2 (Accelerator pedal position) | % | Accelerator pedal is released: 20.2— 21.4%<br>Accelerator pedal is depressed: 58.8— 70.8% | • APP sensor | 1AC |
| | V | Accelerator pedal is released: 1.01— 1.10 V<br>Accelerator pedal is depressed: 3.10— 3.38 V | | |
| ARPMDES (Target engine speed) | RPM | Shift position: P or N<br>— No load: 700 rpm<br>— E/L operating: 700 rpm<br>— P/S operating: 700 rpm<br>— A/C ON: 700 rpm | • The following PIDs:<br>— IAT, RPM, MAP, ECT, MAF, TP, INGEAR, PSP, ALTT V<br>• CKP sensor | — |
| BARO (Barometric pressure) | kPa, Bar, psi | Ignition switch is ON at sea level: Approx. 101 kPa {1.01 Bar, 14.6psi} | • BARO sensor | — |
| | V | Ignition switch is ON at sea level: Approx. 4.0 V | | |
| BAT | °C | Boost air temperature is displayed | • MAP/boost air temperature sensor | 2N |
| BAT_V | V | Boost air temperature 20 °C {68 °F}: 2.4— 2.6 V | • MAP/boost air temperature sensor | 2N |
| | | Boost air temperature 30 °C {86 °F}: 1.7— 1.9 V | | |
| BOO (Brake switch) | On/Off | Brake pedal depressed: On<br>Brake pedal released: Off | • Brake switch No.1/No.2 | 1AB<br>1AF |

| Monitor item (Definition) | Unit/ Condition | Condition/Specification (Reference) | Inspection item | PCM terminal |
|---|---|---|---|---|
| BPA (Brake pressure applied switch) | On/Off | Brake pedal depressed: On<br>Brake pedal released: Off | • Brake switch No.1/No.2 | 1AB<br>1AF |
| CATT11_DSD (Estimated catalytic converter temperature) | °C °F | Indicate the estimated catalytic converter temperature | • Perform applicable DTC troubleshooting. | — |
| CHRGLP (Generator warning light) | On/Off | Ignition switch to the ON position: On<br>Idle: Off | • Perform applicable DTC troubleshooting. | — |
| COLP (Refrigerant pressure switch (middle)) | ON/OFF | Refrigerant pressure is more than the specification. (Refrigerant pressure switch (middle) is on.): On<br>Refrigerant pressure is less than the specification. (Refrigerant pressure switch (middle) is off.): Off | • Refrigerant pressure switch (middle) | 1J |
| DTCCNT (Number of DTC detected) | — | Indicates number of DTC | • Perform applicable DTC troubleshooting. | — |
| ECT (Engine coolant temperature) | °C °F | Ignition switch to the ON position: Indicate the ECT | • ECT sensor | 2AH |
| | V | ECT 20 °C {68 °F}: 3.04— 3.14 V<br>ECT 60 °C {140 °F}: 1.29— 1.39 V | | |
| EQ_RAT11 (Equivalence ratio (lambda)) | — | Idling after warm-up: Approx. 1 | • Perform applicable DTC troubleshooting. | — |
| EQ_RAT11_DSD (Front oxygen sensor) | — | Idling after warm-up: Approx. 1 | • Perform applicable DTC troubleshooting. | — |
| ETC_ACT (Electronic throttle control actual) | ° | Indicate the desired TP by angle | • Perform applicable DTC troubleshooting. | 2AK<br>2AL |
| ETC_DSD (Electronic throttle control desired) | % | Indicate the desired TP by percent | • The following PIDs:<br>— APP1, APP2, ETC_ACT<br>• TP sensor | 2AK<br>2AL |
| | ° | Indicate the desired TP by angle | | |
| EVAPCP (Purge solenoid valve duty value) | % | Ignition switch to the ON position: 0%<br>Idle: 0% | • The following PIDs:<br>— IAT, RPM, ECT, MAF, O2S11,BARO, INGEAR, VPWR<br>• Purge solenoid valve | 2AB |
| FAN_DUTY | % | ECT less than 98 °C {208 °F}: 0%<br>ECT 100 °C {212 °F}: 30%<br>ECT 106 °C {223 °F}: 70%<br>ECT 110 °C {230 °F}: 100% | • Fan control module | 1R<br>1AE |
| FIA (Fuel injection amount) | — | Indicate the fuel injection amount. | • Fuel injector<br>• Fuel Injector relay | — |
| FLI (Fuel level) | % | Fuel gauge level F: Approx. 100%<br>Fuel gauge level E: Approx. 0% | • Perform applicable DTC troubleshooting. | — |
| FP (Fuel pump relay) | On/Off | Idle: On<br>Cranking: On | • The following PIDs:<br>— RPM<br>• Fuel pump relay | 1H |
| FP_Hi_PRES | On/Off | Spill valve control solenoid valve work: On<br>Spill valve control solenoid valve don't work: Off | • High pressure fuel pump | 2F<br>2G |
| FUEL_PRES | Pa | Idle: Approx. 3 MPa<br>Load 60 % or more: Approx. 11.5 MPa | • Fuel pressure sensor | 2R |
| FUEL_PRES_V | V | Ignition switch to the ON position: Approx. 1.1 V<br>Idle: Approx. 1.7 V | • Fuel pressure sensor | 2R |
| FUELPW (Fuel injector duration) | sec | Idle: Approx. 2.0 ms | • The following PIDs:<br>— ECT, IAT, RPM, TP, MAF, O2S11, O2S12, MAP, VSS, TR, BOO, AC_REQ, COLP, VPWR | 2AZ<br>2BB<br>2BC<br>2BD |

| Monitor item (Definition) | Unit/ Condition | Condition/Specification (Reference) | Inspection item | PCM terminal |
|---|---|---|---|---|
| FUELSYS (Fuel system status) | OL/CL/ OL-Drive/ OL-Fault/ CL-Fault | Ignition switch to the ON position: OL_Drive<br>Idle (after warm up): CL | • The following PIDs:<br>— IAT, MAF, TP, MAP, ECT, RPM, O2S11, O2S12, INGEAR, PSP, VPWR, ALTT V<br>• Fuel injector | — |
| GENVDSD (Generator voltage desired) | V | Idle: Approx. 13.83 V[*1](E/L not operating) | • Perform applicable DTC troubleshooting. | — |
| HTR11 (HO2S heater (front)) | On/Off | Idle (after warm up): On⇔Off | • The following PIDs:<br>— IAT, MAF, TP, ECT, RPM | 2C |
| HTR12 (HO2S heater (rear)) | On/Off | Idle: On<br>Engine speed is above 4,000 rpm: Off | • The following PIDs:<br>— IAT, MAF, ECT, RPM, ACSW | 2D |
| IAT (Intake air temperature) | °C °F | Ignition switch to the ON position position: Indicate the IAT | • MAF/IAT sensor | 1M |
| | V | IAT 20 °C {68 °F}: 2.4— 2.6V<br>IAT 30 °C {86 °F}: 1.7— 1.9V | | |
| IMRC (Variable swirl solenoid valve) | On/Off | Engine speed is below Approx. 3,750 rpm and ECT is below 60 °C {140 °F}: On<br>Others: Off | • The following PIDs:<br>— TP, ECT, RPM<br>• Variable swirl solenoid valve | 2AS |
| INGEAR (Load/no load condition) | On/Off | Driving range: On<br>Except above: Off<br>Others: On | • Perform applicable DTC troubleshooting. | — |
| IVS (CTP condition) | Idle/ Off Idle | APP closed: Idle<br>Others: Off Idle | • Perform applicable DTC troubleshooting. | 2AK<br>2AL |
| KNOCKR (Knocking retard) | ° | Ignition switch to the ON position: 0 °<br>Idle: 0 ° | • KS | 2U<br>2V |
| LDP_EVAPCP (EVAP system leak detection pump detect incorrect purge flow) | A | Indicate the EVAP control system incorrect purge flow detection value | • Perform applicable DTC troubleshooting. | — |
| LDP_IDL (EVAP system leak detection pump idle current) | A | Indicate the EVAP system leak detection pump idle current | • Perform applicable DTC troubleshooting. | — |
| LDP_MON (EVAP system leak detection pump monitoring current) | A | Indicate the EVAP system leak detection pump monitoring current | • Perform applicable DTC troubleshooting. | — |
| LDP_REF (EVAP system leak detection pump reference current) | A | Indicate the EVAP system leak detection pump reference current | • Perform applicable DTC troubleshooting. | — |
| LDP_SLDV (EVAP system small leak detection value) | A | Indicate the EVAP control system small leak detection value | • Perform applicable DTC troubleshooting. | — |
| LDP_VSL_FV[*1](EVAP system very small leak detection fail value) | mA/sec | Indicate EVAP system very small leak detection fail value | • Perform applicable DTC troubleshooting. | — |
| LDP_VSL_SV[*1] (EVAP system very small leak detection safe value) | mA/sec | Indicate EVAP system very small leak detection safe value | • Perform applicable DTC troubleshooting. | — |
| LDP_VSLDV[*1] (EVAP system small leak detection value) | mA/sec | Indicate the EVAP control system vary small leak detection value | • Perform applicable DTC troubleshooting. | — |
| LOAD (Engine load) | % | Ignition switch to the ON position: 0%<br>Idle (after warm up): 17.1— 18.5%<br>Engine speed is 2,500 rpm: 14.2— 15.2 | • MAF/IAT sensor | — |

| Monitor item (Definition) | Unit/ Condition | Condition/Specification (Reference) | Inspection item | PCM terminal |
|---|---|---|---|---|
| LONGFT1 (long term fuel trim) | % | Idle (after warm up):–14— 14% | • Perform applicable DTC troubleshooting. | — |
| MAF (Mass airflow) | g/s | Ignition switch to the ON position: Approx. 0 g/s<br>Idle (after warm up): 2.72— 2.94 g/s<br>Engine speed is 2,500 rpm: 8.00— 8.66 | • MAF/IAT sensor | 1AK |
| | V | Ignition switch to the ON position: Approx. 0.7 V<br>Idle (after warm up): Approx. 1.3 V | | |
| MAP (Manifold absolute pressure) | Pa | Ignition switch to the ON position: Indicate the atmospheric pressure | • MAP sensor | 2AG |
| | V | Ignition switch to the ON position: Approx. 1.9 V<br>Idle (after warm up): Below 1.0 V | | |
| MIL (Malfunction indicator lamp) | On/Off | Ignition switch to the ON position: On<br>Idle: Off | • Perform applicable DTC troubleshooting. | — |
| MIL_DIS (Traveled distance since the MIL illuminated) | km / mile | No DTC: 0 km {0 mile}<br>DTC detected: Not 0 km {0 mile} | • Perform applicable DTC troubleshooting. | — |
| O2S11 (Front oxygen sensor) | A | Idle (after warm up): –1.0— 1.0 A<br>Deceleration (after warm up): 0.25 A or more | • HO2S (front) | 2Z<br>2AC<br>2AD |
| O2S12 (Rear oxygen sensor) | V | Idle: 0— 1 V | • HO2S (rear) | 2Q |
| PSP (Power steering pressure switch) | High/Low | Steering wheel in straight ahead position: Low<br>Others: High | • PSP switch | 2T |
| RO2FT1 (Rear oxygen sensor fuel trim) | — | • Idle after warm-up: Approx. 0.2 | • The following PID<br>— O2S12 | 2Q |
| RPM (Engine speed) | RPM | No load: 650— 750 rpm<br>E/L operating: 650— 750 rpm<br>P/S operating: 650— 750 rpm<br>A/C ON: 650— 750 rpm | • CKP sensor | 2W |
| SCCS (Speed control command switch) | V | Press ON/OFF: Approx. 0 V<br>Press CANCEL: Approx. 1.1 V<br>Press SET/COAST: Approx. 3.1 V<br>Press RES/ACCEL: Approx. 4.2 V<br>Others: Approx. 5.0 V | • Cruise control switch | 1AQ |
| SEGRP (EGR valve (stepping motor) position) | — | Idle: 0 step<br>Cranking: 0— 60 steps | • The following PIDs:<br>— MAF, TP, ECT, RPM, VSS<br>• EGR valve | — |
| SEGRP DSD (Desired EGR valve (stepping motor) position) | % | Idle: 0% | • The following PIDs:<br>— MAF, TP, ECT, RPM, VSS | — |
| SELTESTDTC (DTC of KOEO/KOER self-test) | — | — | • Perform applicable DTC troubleshooting. | — |
| SHRTFT1 (Short term fuel trim [front HO2S]) | % | Idle (after warm up): Approx.–30— 25% | • Perform applicable DTC troubleshooting. | — |
| SHRTFT12 (Short term fuel trim) | % | Idle (after warm up): Approx.–30— 25% | • Perform applicable DTC troubleshooting. | — |
| SPARKADV (Ignition timing) | °(BTDC) | Idle: BTDC Approx. 10° | • The following PIDs:<br>— MAF, TP, ECT, RPM, INGEAR, PSP, ACSW, VPWR<br>• Ignition timing | — |
| test (Test mode) | On/Off | — | — | — |
| TIRESIZE (Tire revolution per mile) | rev/mile | Indicate the tire circumference length | — | — |

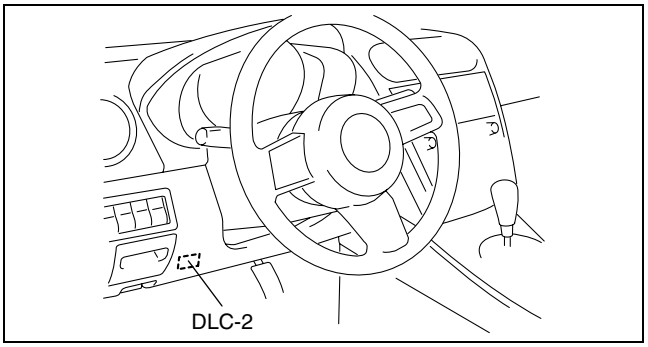
| Monitor item (Definition) | Unit/ Condition | Condition/Specification (Reference) | Inspection item | PCM terminal |
|---|---|---|---|---|
| TP REL (Relative TP) | % | Ignition switch to the ON position<br>APP is released: Approx. 5%<br>APP is depressed: Approx. 46 % | • TP sensor | 2AK<br>2AL |
| TP1 (TP sensor 1) | % | Ignition switch to the ON position<br>APP is released: Approx. 15%<br>APP is depressed: Approx. 55 % | • TP sensor | 2AK |
| | V | Ignition switch to the ON position<br>APP is released: 0.4— 0.6 V<br>APP is depressed: 4.7— 4.9 V | | |
| TP2 (TP sensor 2) | % | Ignition switch to the ON position<br>APP is released: Approx. 15%<br>APP is depressed: Approx. 56% | • TP sensor | 2AL |
| | V | Ignition switch to the ON position<br>APP is released: 4.4— 4.6 V<br>APP is depressed: 0.1— 0.3 V | | |
| TPCT<br>(Lowest closed throttle voltage) | V | Ignition switch to the ON position:<br>Approx 1.0 V | • TP sensor | 2AK<br>2AL |
| VPWR (Battery positive voltage) | V | Indicate the battery voltage | • Battery | 1BA |
| VSS (Vehicle speed) | KPH / MPH | Indicate the vehicle speed | • Perform applicable DTC troubleshooting. | — |
| VT ACT1 (Actual valve timing) | ° | Idle: Approx. 0° | • The following PIDs:<br>— TP, ECT, RPM<br>• OCV | — |
| VT DIFF1 (Difference between actual valve timing and target valve timing) | ° | Idle: Approx. 0° | • The following PIDs:<br>— TP, ECT, RPM<br>• OCV | 2AF |
| VT DUTY1 | % | Idle: Approx. 11.5% | • The following PIDs:<br>— TP, ECT, RPM<br>• OCV | 2AF |
| VTC | On/Off | Variable swirl shutter valve switch ON: On | • Variable swirl shutter valve switch | 2AE |
| | | Variable swirl shutter valve switch OFF: Off | | |
| WGC | % | Racing with the accelerator pedal fully depressed: 10— 100 % | • Wastegate control solenoid valve | 2AA |
| | | Fully closed: 0 % | | |

*1 : California emission regulation applicable model

### PCM CONFIGURATION[L3 WITH TC]

id014039802600

1. Connect the M-MDS to DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Module Programming”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select the “Programmable Module Installation”, “PCM” from the screen menu.

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**Note**
- If the PCM is replaced with a new one, the PCM stores DTC P0602, illuminates the MIL even though no malfunction is detected. When the configuration is completed, DTC P0602 is cleared.

4. Retrieve DTC’s using the M-MDS, then verify that DTC are present.
   - If a DTC is present, perform the applicable DTC inspection.

## POWER STEERING PRESSURE (PSP) SWITCH INSPECTION[L3 WITH TC]

id014039803100

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

**Continuity Inspection**

1. Inspect the following if the power steering is inoperative (See06-14-3 POWER STEERING FLUID INSPECTION.):
   - Power steering fluid level
   - Power steering fluid leakage
   - Power steering fluid pressure
2. Disconnect the PSP switch connector.
3. Start the engine.
4. Inspect for continuity between the PSP switch terminal and ground using a tester.
   - If not as specified, replace the PSP switch. (See06-14-21 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)
   - If the PSP switch is normal, but PID value is out of specification, perform the “Circuit Open/Short Inspection”.

**Specification**

○—○ : Continuity

| Condition | Terminal | GND |
|---|---|---|
| Steering wheel in straight ahead position | | |
| While turning steering wheel | ○ | ○ |

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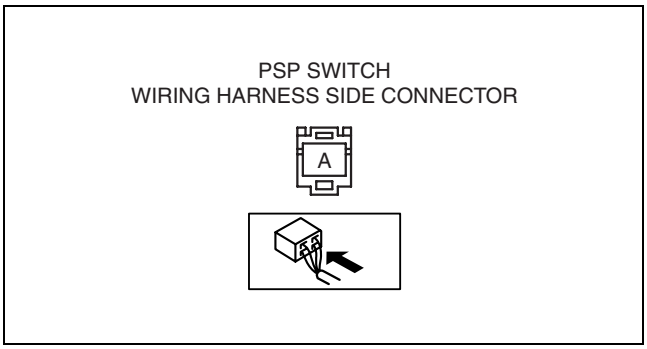
**Circuit Open/Short Inspection**

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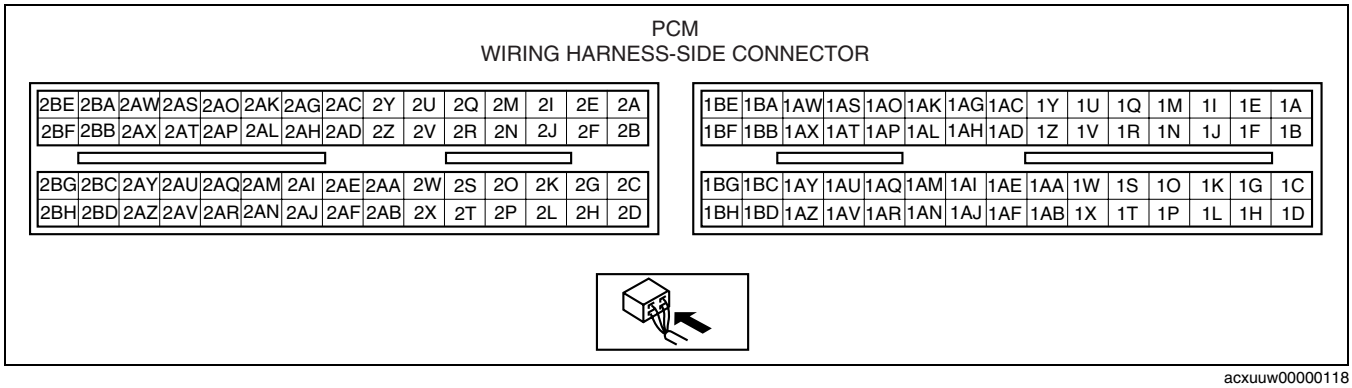


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  — PSP switch terminal and PCM terminal 2T

**Short circuit**
- If there is no continuity, there is a short circuit. Repair or replace the wiring harness.
  — PSP switch terminal and body ground

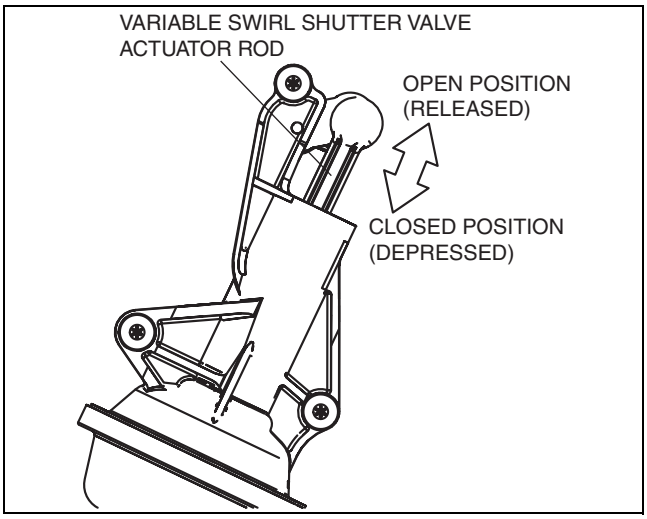
## VARIABLE SWIRL SHUTTER VALVE SWITCH INSPECTION[L3 WITH TC]

id014039803000

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See00-00-3 HOW TO USE THIS MANUAL.)

**Voltage Inspection**

1. Turn the ignition switch to the ON position (Engine off).
2. Verify that the PCM terminal 2AE voltage is as shown in the following table when the variable swirl shutter valve actuator rod is depressed and released by hand.

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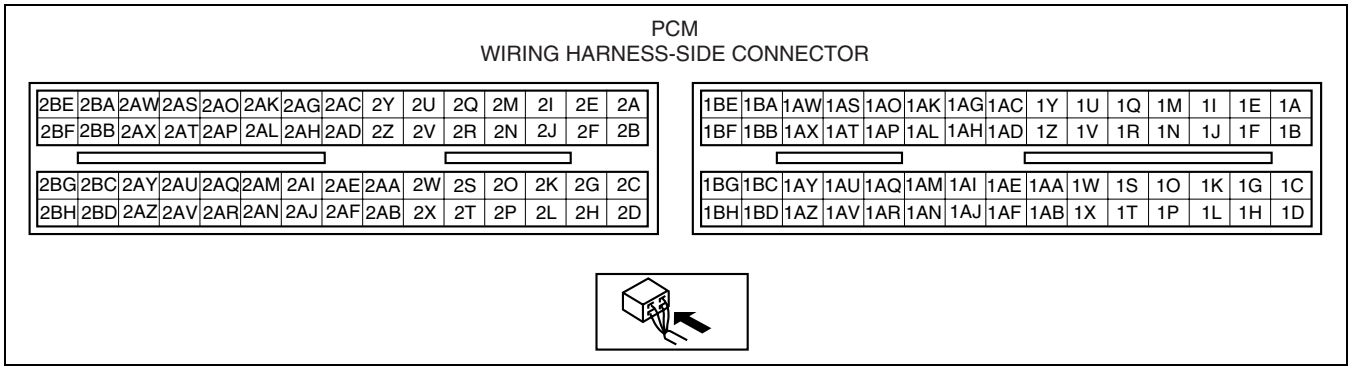


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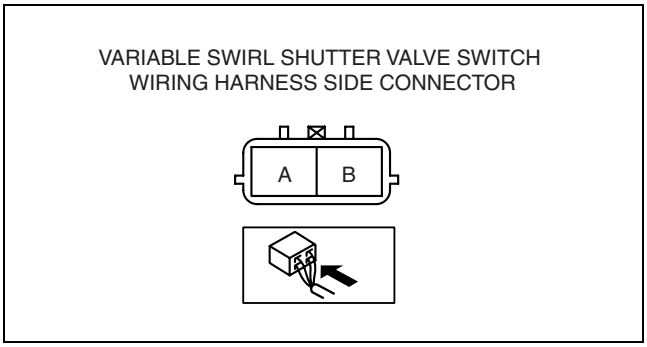
- If not as specified, perform the “Circuit Open/Short Inspection”.
  - — If there is no open or short circuit, replace the intake manifold. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

**Variable swirl shutter valve switch output voltage**

| Condition | PCM terminal 2AE |
|---|---|
| Released (Open position) | B+ |
| Depressed (Closed position) | Below 1.0 V |

**Circuit Open/Short Inspection**

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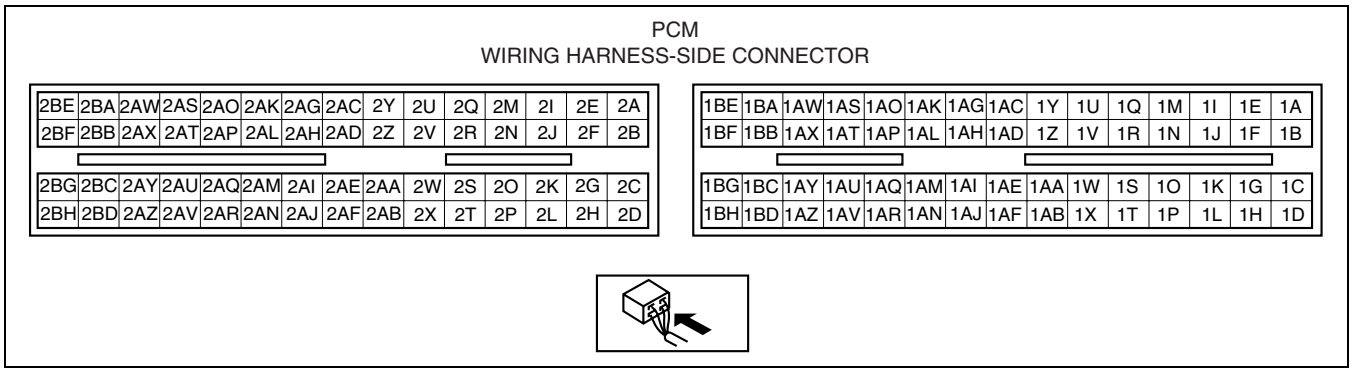


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Variable swirl shutter valve switch terminal A and PCM terminal 2AE
  - — Variable swirl shutter valve switch terminal B and body ground.

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Variable swirl shutter valve switch terminal A and power supply
  - — Variable swirl shutter valve switch terminal A and body ground
  - — Variable swirl shutter valve switch terminal B and power supply

**ENGINE COOLANT TEMPERATURE (ECT) SENSOR REMOVAL/INSTALLATION[L3 WITH TC]**

id014039801900

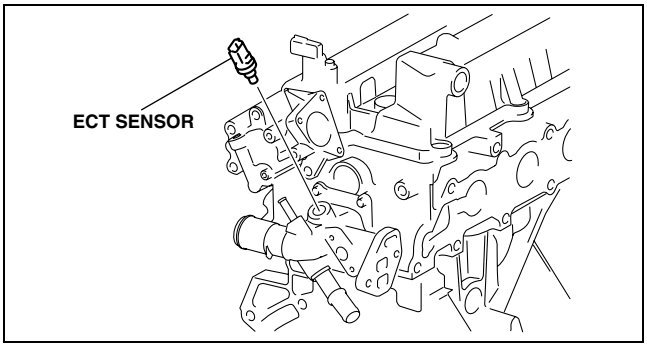
**Warning**
- **A hot engine can cause severe burns. Turn off the engine and wait until it is cool before removing the ECT sensor.**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the air cleaner and air hose. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
5. Drain the engine coolant. (See01-12-2 COOLING SYSTEM SERVICE WARNINGS[L3 WITH TC].)
6. Disconnect the wiring harness.

7. Remove the ECT sensor.
8. Install in the reverse order of removal.

**Tightening torque**
**10— 14 N·m {102— 142 kgf·cm, 89— 123 in·lbf}**

9. Refill the engine coolant. (See01-12-2 COOLING SYSTEM SERVICE WARNINGS[L3 WITH TC].)

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**ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION[L3 WITH TC]**

id014039802000

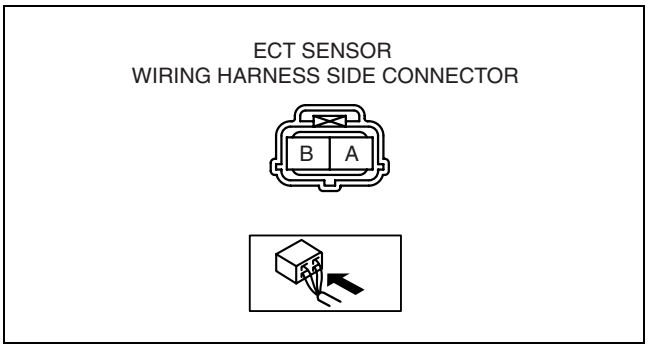
**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

**ECT Sensor Resistance Inspection**
1. Drain the engine coolant. (See01-12-2 COOLING SYSTEM SERVICE WARNINGS[L3 WITH TC].)
2. Remove the ECT sensor (located above the starter).
3. Place the ECT sensor in water with a thermometer, and heat the water gradually.
4. Measure the resistance between the ECT sensor terminals A and B using a tester.
   - If not as specified, replace the ECT sensor.
   - If the ECT sensor is normal, but PID value is out of specification, perform the “Circuit Open/Short Inspection”.

**Specification**

| Water temperature (°C {°F}) | Resistance (kilohm) |
|---|---|
| 20 {68} | 35.48— 39.20 |
| 80 {176} | 3.65— 4.02 |

**Circuit Open/Short Inspection**

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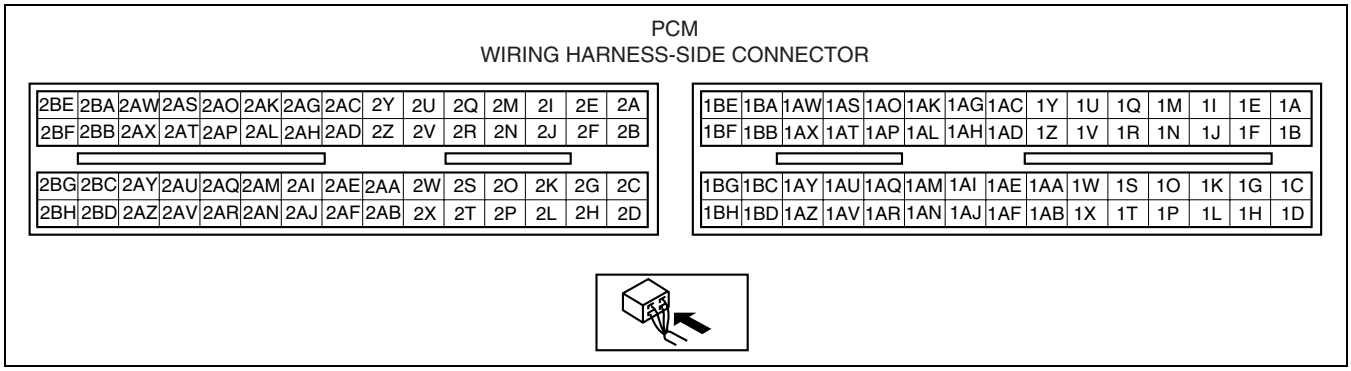


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — ECT sensor terminal A and PCM terminal 2AH
  - — ECT sensor terminal B and PCM terminal 2AY

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — ECT sensor terminal A and power supply
  - — ECT sensor terminal A and body ground
  - — ECT sensor terminal B and power supply

## MASS AIR FLOW (MAF) SENSOR INSPECTION[L3 WITH TC]

id014039800700

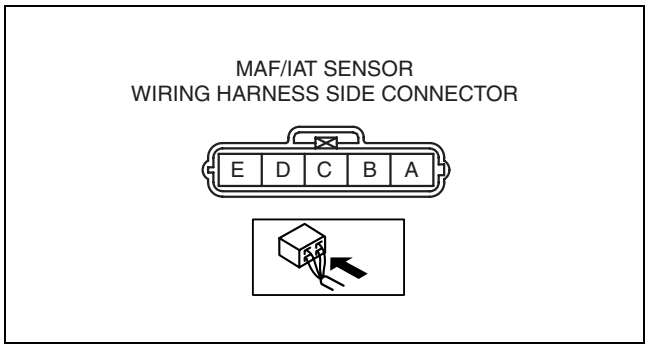
**Visual Inspection**

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

1. Visually inspect for the following on the MAF sensor. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
   - Damage
   - Cracks
   - Bent terminals
   - Terminal rust
     - — If any of the above are found, replace the MAF/IAT sensor.
     - — If the monitor item status/specification (reference) is not within the specification even though there is no malfunction, perform the "Circuit Open/Short Inspection".

**Voltage Inspection**
1. Remove the MAF/IAT sensor without disconnect the MAF/IAT sensor connector.
2. Turn the ignition switch to the ON position.
3. As the air gradually approaches the MAF detection part of the MAF/IAT sensor, verify that the voltage at PCM terminal 1AK (M-MDS PID: MAF) varies.
   - If it cannot be verified even though the related harnesses have no malfunction, replace the MAF/IAT sensor.

**Circuit Open/Short Inspection**

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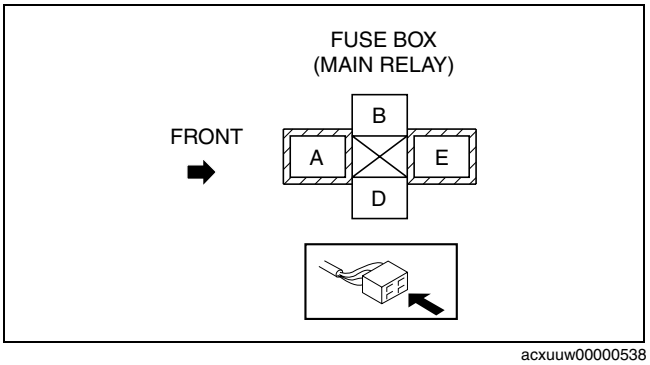


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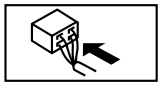
PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Disconnect the MAF/IAT sensor connector.
3. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — MAF/IAT sensor terminal A and main relay terminal E
  - — MAF/IAT sensor terminal B and PCM terminal 1P
  - — MAF/IAT sensor terminal C and PCM terminal 1AK

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — MAF/IAT sensor terminal A and body ground
  - — MAF/IAT sensor terminal B and power supply
  - — MAF/IAT sensor terminal C and power supply
  - — MAF/IAT sensor terminal C and body ground

## INTAKE AIR TEMPERATURE (IAT) SENSOR INSPECTION[L3 WITH TC]

id014039802200

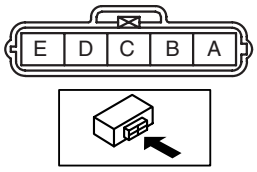
### Resistance Inspection

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

1. Disconnect the MAF/IAT sensor.
2. Measure the resistance between the MAF/IAT sensor terminals D and E using a tester.
   - If not as specified, replace the MAF/IAT sensor. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   - If the MAF/IAT sensor is normal, but the PID is out of specification, perform the “Circuit Open/Short Inspection”.

**Specification**

| Ambient temperature (°C {°F}) | Resistance (kilohm) |
|---|---|
| 20 {68} | 2.21— 2.69 |
| 60 {140} | 0.493— 0.667 |

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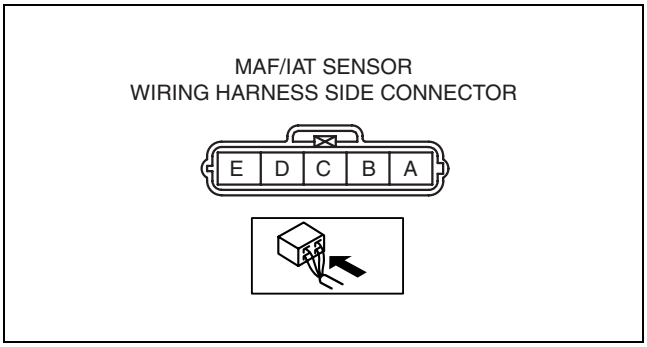
**Circuit Open/Short Inspection**

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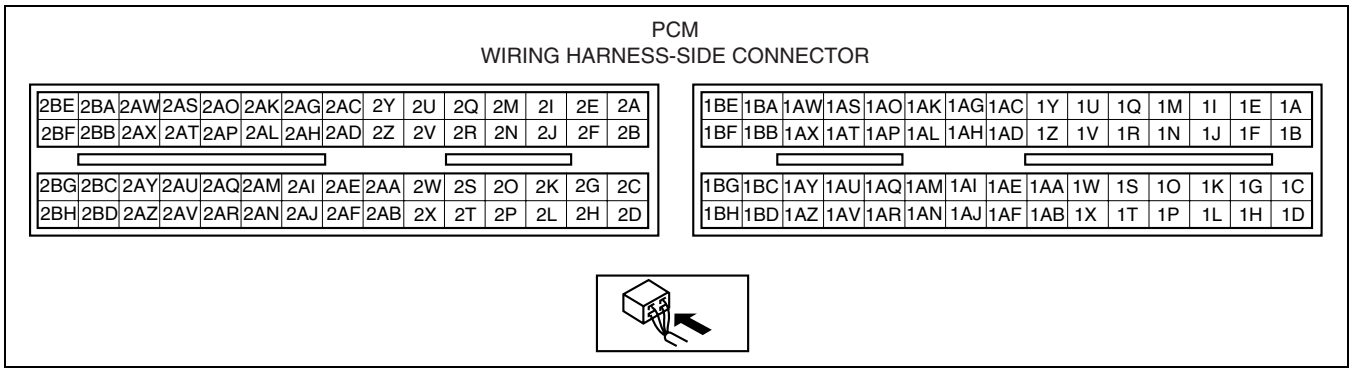


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — MAF/IAT sensor terminal D and PCM terminal 1M
  - — MAF/IAT sensor terminal E and PCM terminal 1AR

**Short circuit**

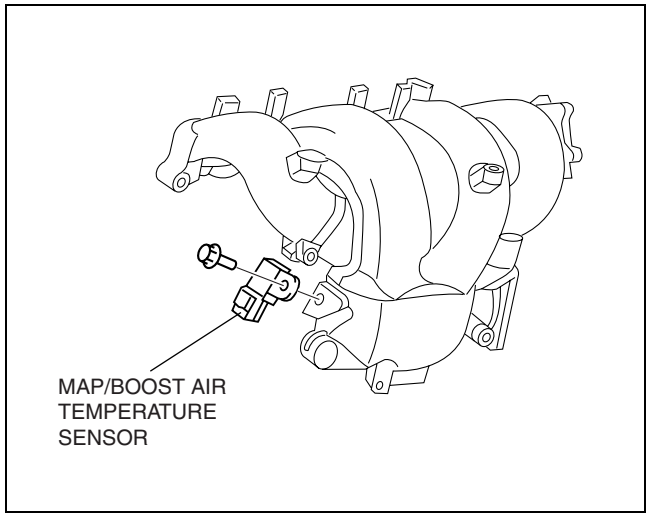
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — MAF/IAT sensor terminal E and power supply
  - — MAF/IAT sensor terminal D and power supply
  - — MAF/IAT sensor terminal D and body ground

### MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR/BOOST AIR TEMPERATURE SENSOR REMOVAL/ INSTALLATION[L3 WITH TC]

id014039801000

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the oil level gauge pipe. (See01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].)
4. Disconnect the MAP/boost air temperature sensor connector.
5. Remove MAP/boost air temperature sensor from the intake manifold.
6. Install in the reverse order of removal.

**Tightening torque**
**5.0— 7.0 N·m {51— 71 kgf·cm, 45— 61 in·lbf}**

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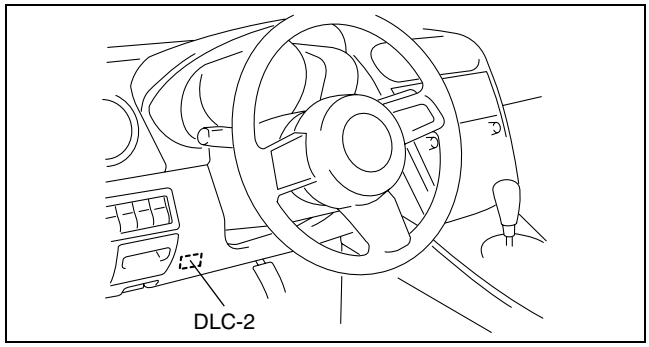
### MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR INSPECTION[L3 WITH TC]

id014039800900

**Note**
- Perform the following inspection only when directed.
- The following vacuum values are indicated by relative pressure from the MAP sensor.

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to ON (Engine off).
3. Select MAP PID on the M-MDS.
4. Verify that the MAP PID (pressure) and barometric pressure are practically equal.
   - If not as verified, perform the “Circuit Open/ Short Inspection”.
     — If there is no open or short circuit, replace the MAP sensor.
   - If as verified, go to next step.
5. Apply vacuum of **–25.0 kPa {–187 mmHg, –7.38 inHg}** to the MAP sensor, and verify that the MAP variation from that of Step 4 is **approx. 25.0 kPa {187 mmHg, 7.38 inHg}**.
   - If not as verified, perform the “Circuit Open/Short inspection”.
     — If there is no open or short circuit, replace the barometric pressure sensor. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

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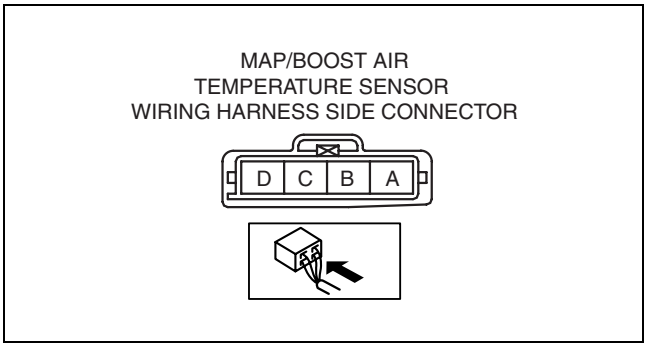
**Circuit Open/Short Inspection**

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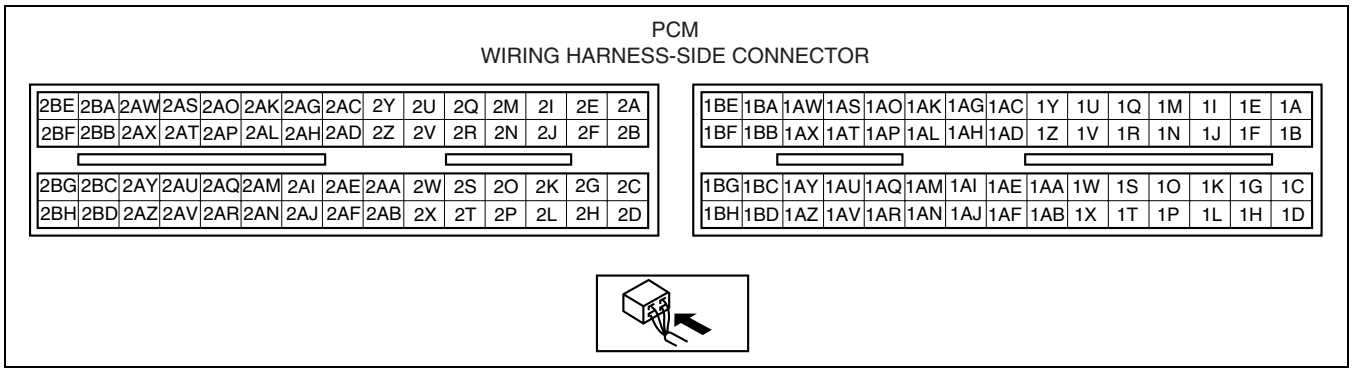


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — MAP/boost air temperature sensor terminal A and PCM terminal 2AV
  - — MAP/boost air temperature sensor terminal C and PCM terminal 2AU
  - — MAP/boost air temperature sensor terminal D and PCM terminal 2AG

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — MAP/boost air temperature sensor terminal A and power supply.
  - — MAP/boost air temperature sensor terminal C and body ground.
  - — MAP/boost air temperature sensor terminal D and power supply.
  - — MAP/boost air temperature sensor terminal D and body ground

## BOOST AIR TEMPERATURE SENSOR INSPECTION[L3 WITH TC]

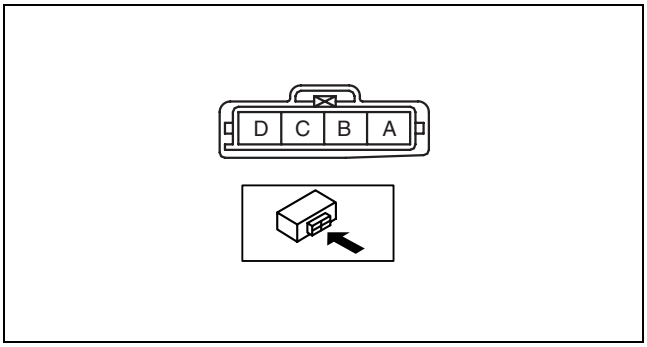
id014039802100

### Resistance Inspection

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)



1. Disconnect MAP/boost air temperature sensor.
2. Measure the resistance between the MAP/boost air temperature sensor terminals A and B using a tester.
   - If not as specified, replace the MAP/boost air temperature sensor. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   - If the MAP/boost air temperature sensor is normal, but PID are out of specification, perform the “Circuit Open/Short Inspection”.

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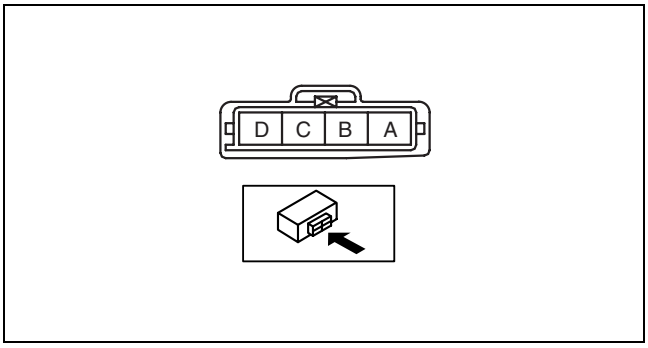
**Specification**

| Ambient temperature (°C {°F}) | Resistance (kilohm) |
|---|---|
| 20 {68} | 2.4— 2.7 |
| 60 {140} | 0.59— 0.64 |

### Circuit Open/Short Inspection

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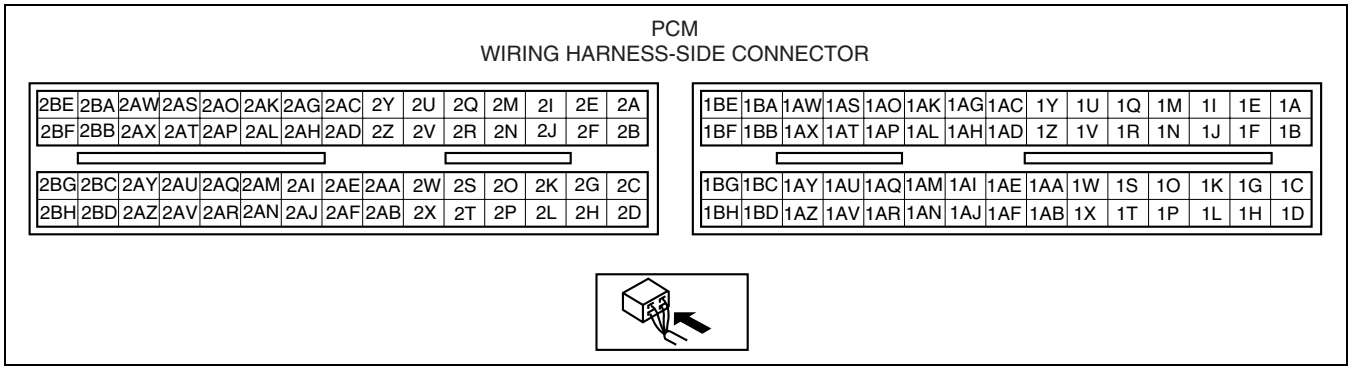


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  — MAP/boost air temperature sensor terminal A and PCM terminal 2AV
  — MAP/boost air temperature sensor terminal B and PCM terminal 2N
  — MAP/boost air temperature sensor terminal C and PCM terminal 2AU

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  — MAP/boost air temperature sensor terminal A and power supply
  — MAP/boost air temperature sensor terminal B and power supply
  — MAP/boost air temperature sensor terminal B and body ground
  — MAP/boost air temperature sensor terminal C and body ground

## THROTTLE POSITION (TP) SENSOR INSPECTION[L3 WITH TC]

id014039802700

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

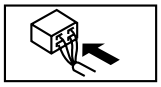
**Voltage Inspection**

1. Verify that no DTC related to the APP sensor has been detected.
   - If any DTCs related to the APP sensor have been detected, perform the DTC inspection. (See01-02-13 DTC TABLE[L3 WITH TC].)
2. Start the engine and warm it up (ECT: **more than 80°C {176 °F}).**
3. Turn the ignition switch to the ON position (Engine off).
4. Verify that the PCM terminal 2AK and 2AL change smoothly while the throttle valve is gradually opened.
   - If as verified, go to next step.
   - If not as verified, perform the “Circuit Open/Short Inspection”.
     — If there is no open or short circuit, replace the throttle body.
5. Verify that the PCM terminal 2AK and 2AL voltages are as shown in the following table.

PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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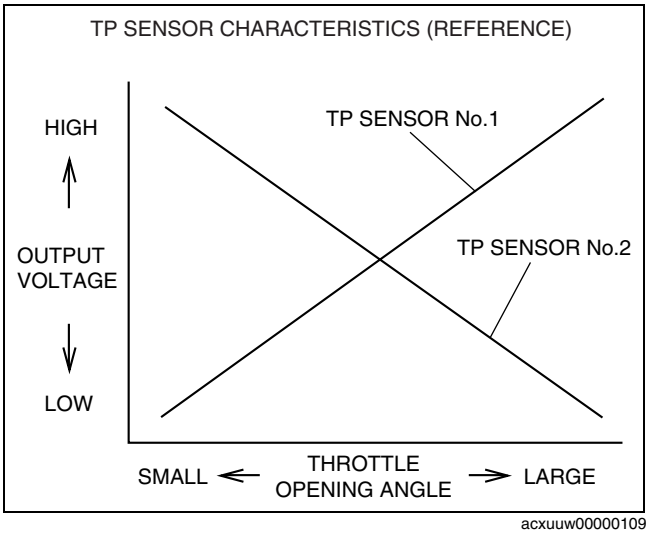
- If the voltage is not according to the following table, perform the “Circuit Open/Short Inspection”.
  — If there is no open or short circuit, replace the throttle body.

**TP sensor output voltage**

| Condition | PCM terminal 2AK (TP sensor No.1) | PCM terminal 2AL (TP sensor No.2) |
|---|---|---|
| APP is released | 0.4— 0.6 V | 4.4— 4.6 V |
| APP is depressed | 4.7— 4.9 V | 0.1— 0.3 V |

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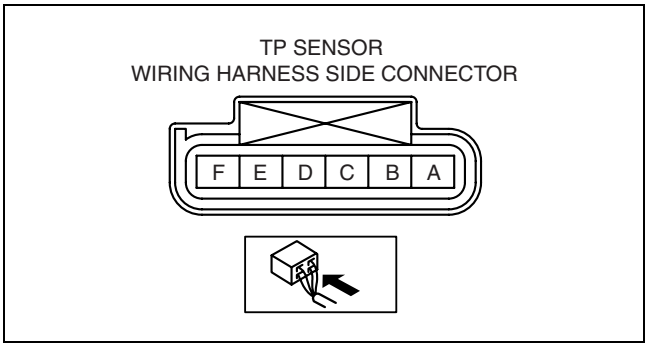
**Circuit Open/Short Inspection**

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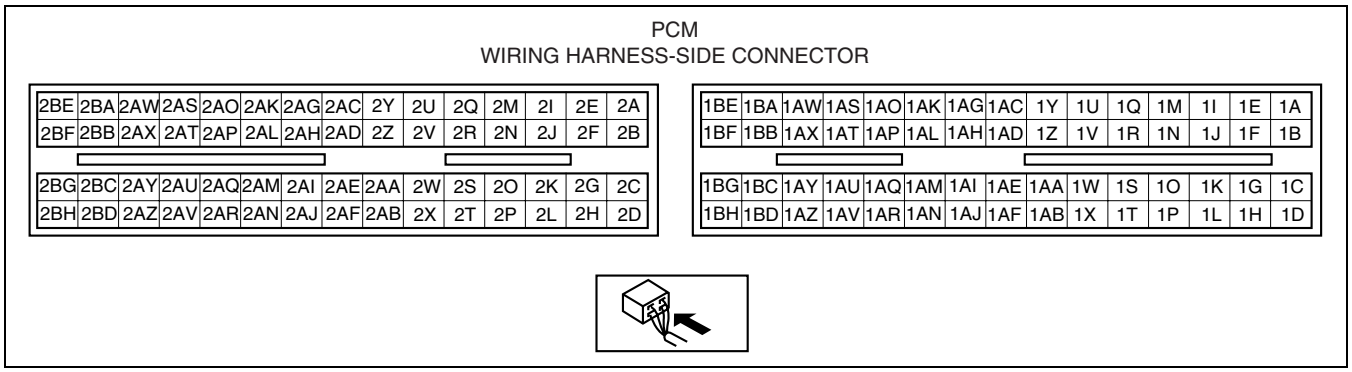


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Throttle body terminal A and PCM terminal 2AK
  - — Throttle body terminal B and PCM terminal 2AO
  - — Throttle body terminal C and PCM terminal 2AL
  - — Throttle body terminal D and PCM terminal 2AP

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Throttle body terminal A and power supply
  - — Throttle body terminal A and body ground
  - — Throttle body terminal B and body ground
  - — Throttle body terminal C and power supply
  - — Throttle body terminal C and body ground
  - — Throttle body terminal D and power supply

**ACCELERATOR PEDAL POSITION (APP) SENSOR INSPECTION[L3 WITH TC]**

id014039803200

**Note**

- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

**Voltage Inspection**

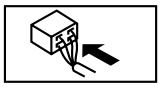
1. Turn the ignition switch to the ON position (Engine off).
2. Verify that the PCM terminal 1Y and 1AC change smoothly while throttle valve is gradually opened.
   - If as verified, go to next step.
   - If not as verified, perform the “Circuit Open/Short Inspection”.
     - — If there is no open or short circuit, replace the throttle body. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

3. Verify that the PCM terminal 1Y and 1AC voltages are as shown in the following table.

PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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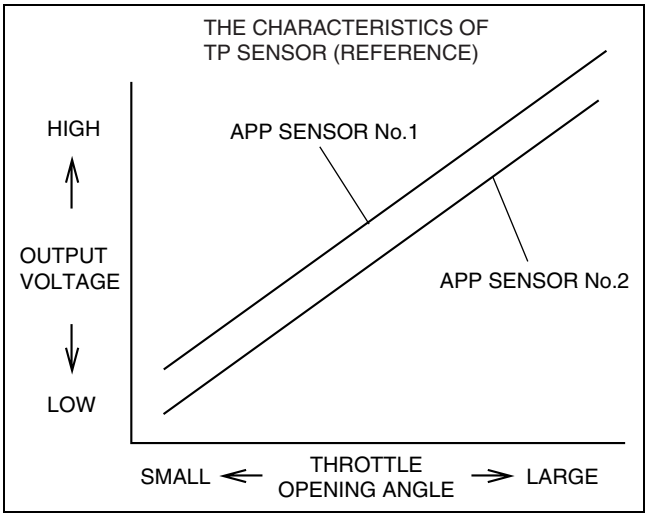
- If the voltage is not according to the following table, perform the “Circuit Open/Short Inspection”.
  — If there is no open or short circuit, replace accelerator pedal. (See01-13-17 ACCELERATOR PEDAL REMOVAL/INSTALLATION[L3 WITH TC].)

**APP sensor output voltage**

| Condition | PCM terminal 1Y (APP sensor No.1) | PCM terminal 1AC (APP sensor No.2) |
|---|---|---|
| APP is depressed | 3.65— 3.93 V | 3.10— 3.38 |
| APP is released | 1.56— 1.65V | 1.01— 1.10 |

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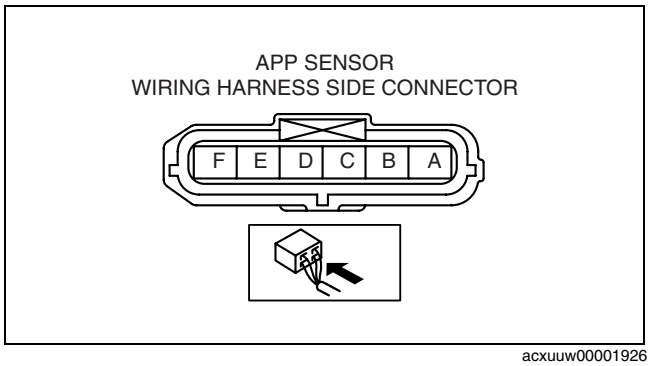
**Circuit Open/Short Inspection**

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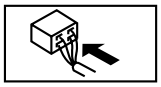
PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — APP sensor terminal A and PCM terminal 1AJ
  - — APP sensor terminal B and PCM terminal 1AV
  - — APP sensor terminal C and PCM terminal 1AC
  - — APP sensor terminal D and PCM terminal 1Q
  - — APP sensor terminal E and PCM terminal 1U
  - — APP sensor terminal F and PCM terminal 1Y



**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — APP sensor terminal A and body ground
  - — APP sensor terminal B and power supply
  - — APP sensor terminal C and power supply
  - — APP sensor terminal C and body ground
  - — APP sensor terminal D and body ground
  - — APP sensor terminal E and power supply
  - — APP sensor terminal F and power supply
  - — APP sensor terminal F and body ground

## FUEL PRESSURE SENSOR REMOVAL/INSTALLATION[L3 WITH TC]

id014039801200

**Note**
- If the fuel pressure sensor is removed, do not reuse the fuel pressure sensor and the fuel delivery pipe. When you replace the fuel pressure sensor, replace a new fuel delivery pipe with a new fuel pressure sensor. (See 01-14-23 FUEL INJECTOR REMOVAL/INSTALLATION[L3 WITH TC])

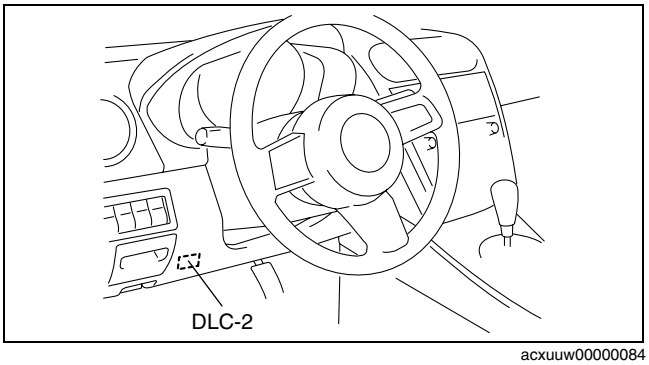
## FUEL PRESSURE SENSOR INSPECTION[L3 WITH TC]

id014039801300

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (Engine off).
3. Select the FUEL_PRES PID on the M-MDS.
4. After warming up the engine, verify that the FUEL_PRES PID is at the standard value under the following conditions.
   - — If not as verified, replace the fuel delivery pipe.

| Step | Condition | FUEL_PRES PID |
|---|---|---|
| 1 | • Idle<br>• 90 s after engine is started | Approx. 3 MPa |
| 2 | • Idle<br>• Spill valve solenoid valve connector is disconnected | Approx. 530 kPa |

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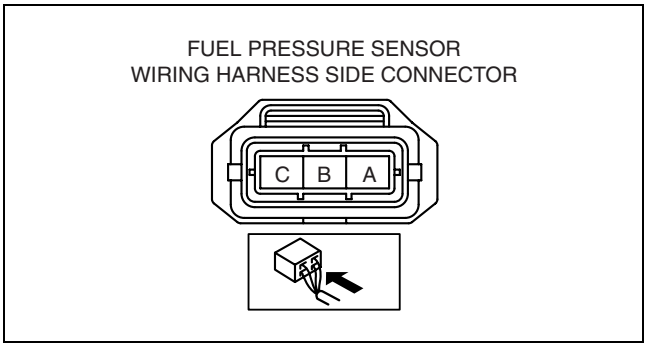
5. After connecting the spill valve control solenoid valve connector, clear the DTC.

**Circuit Open/Short Inspection**

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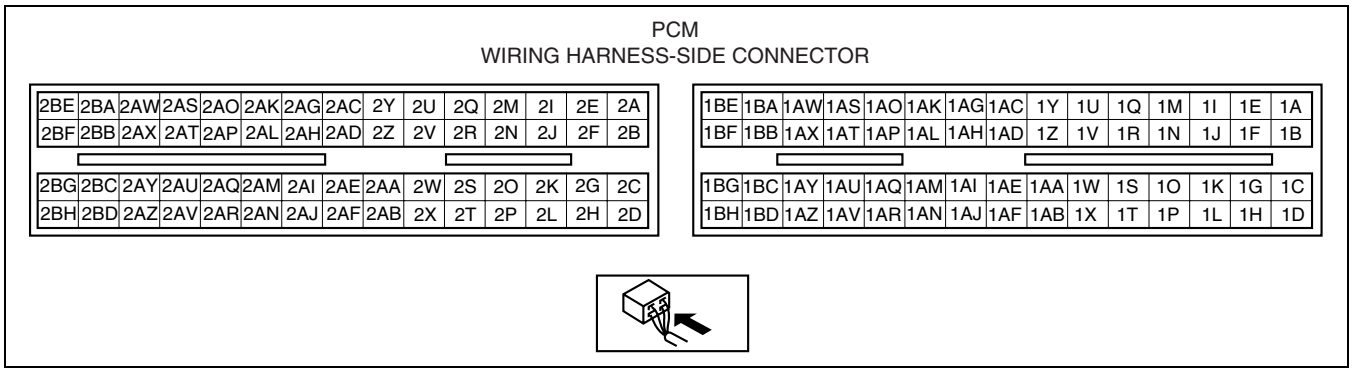


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Fuel pressure sensor terminal A and PCM terminal 2P
  - — Fuel pressure sensor terminal B and PCM terminal 2R
  - — Fuel pressure sensor terminal C and PCM terminal 2I

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Fuel pressure sensor terminal A and power supply.
  - — Fuel pressure sensor terminal B and power supply.
  - — Fuel pressure sensor terminal B and body ground.
  - — Fuel pressure sensor terminal C and body ground

## HEATED OXYGEN SENSOR (HO2S) REMOVAL/INSTALLATION[L3 WITH TC]

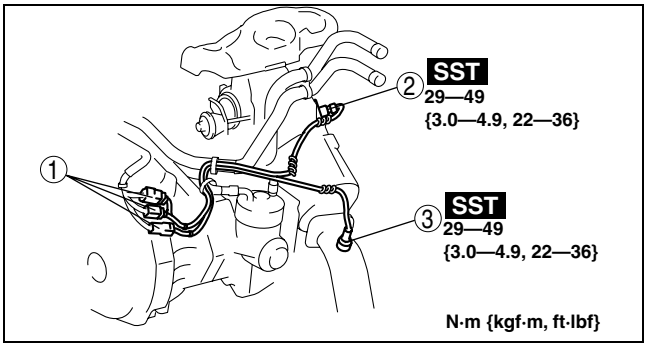
id014039804000

**Warning**
- **A hot engine and exhaust system can cause severe burns. Turn off the engine and wait until they are cool before removing the exhaust system.**



1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

| | |
|---|---|
| 1 | Connector |
| 2 | Front HO2S<br>(See01-40-37 HO2S Removal Note.) |
| 3 | Rear HO2S<br>(See01-40-37 HO2S Removal Note.) |

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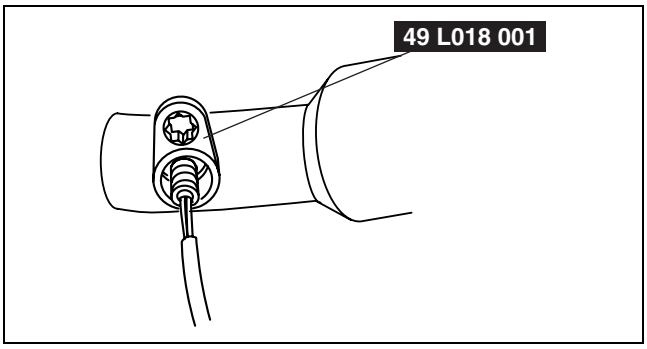
**HO2S Removal Note**

1. Remove the HO2S using the **SST**.

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## HEATED OXYGEN SENSOR (HO2S) INSPECTION[L3 WITH TC]

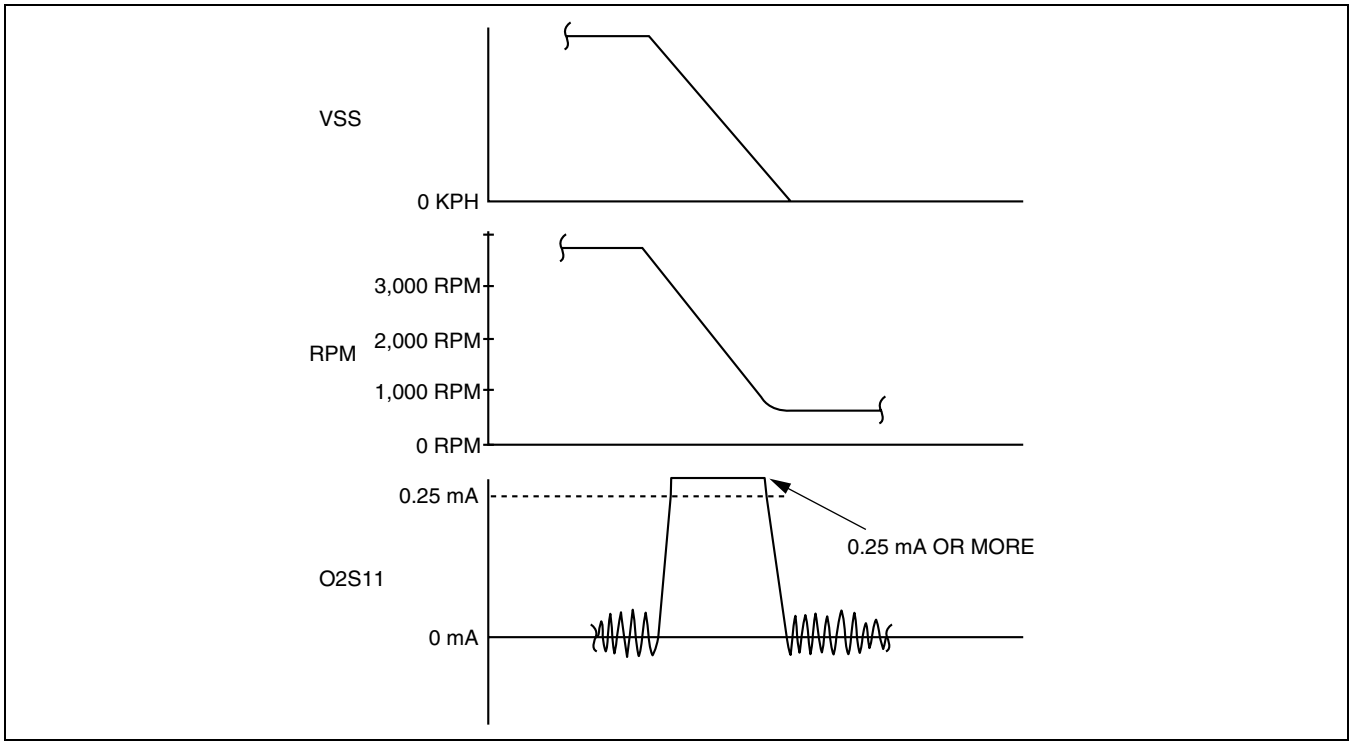
id014039802300

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

**Front HO2S Current Inspection**

1. Warm up the engine to normal operating temperature.
2. Using the M-MDS, monitor the following:
   — Vehicle speed (PID: VSS)
   — Engine speed (PID: RPM)
   — Front HO2S current (PID: O2S11)
3. Drive the vehicle and decelerate the engine speed by releasing the accelerator pedal fully when the engine speed is **3,000 rpm or more.**

4. Verify that the front HO2S current (PID: O2S11) is **0.25 mA or more** while decelerating as shown in the figure.

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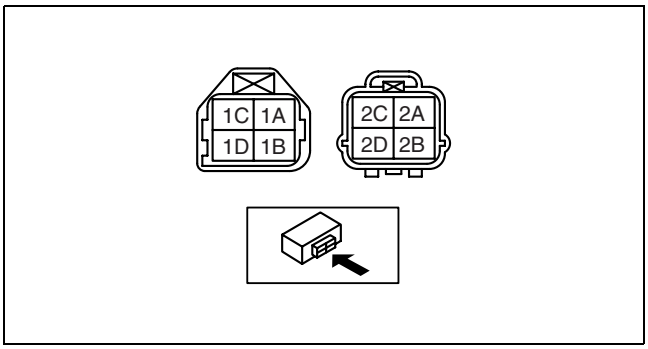
- If not within the specification, inspect the HO2S for an open or short circuit. (See01-40-38 Front HO2S Circuit Open/Short Inspection (Sensor).) Then if there is no malfunction in the wiring harness, replace the front HO2S.

**Front HO2S Heater Resistance Inspection**

1. Disconnect the front HO2S connector.
2. Measure the resistance between front HO2S terminals 2B and 2D.
   - If not within the specification, replace the front HO2S. (See01-40-37 HEATED OXYGEN SENSOR (HO2S) REMOVAL/ INSTALLATION[L3 WITH TC].)

   **Front HO2S heater resistance**
   **1— 10 ohms**

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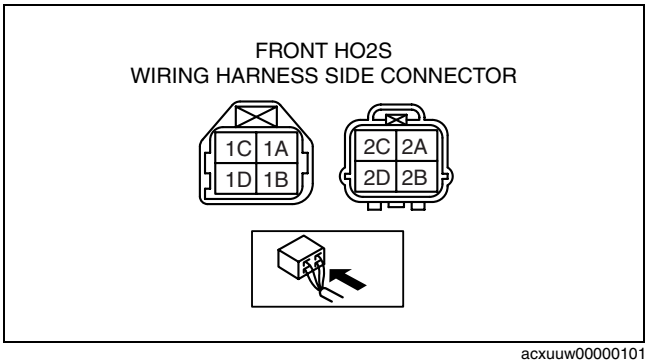
**Front HO2S Circuit Open/Short Inspection (Sensor)**

1. Disconnect the PCM connector.
2. Disconnect the front HO2S connector.
3. Inspect the following wiring harnesses for an open or short circuit. (Continuity inspection)

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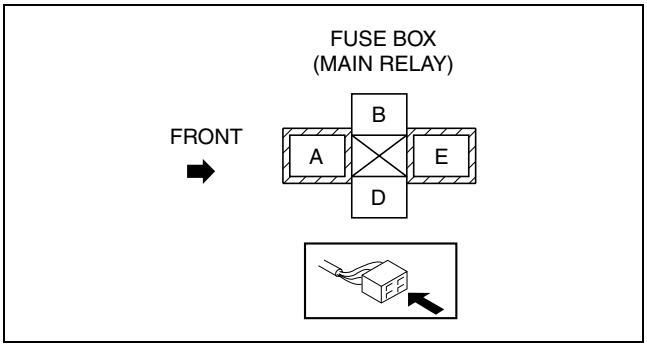


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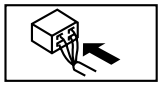
PCM
WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2BE | 2BA | 2AW | 2AS | 2AO | 2AK | 2AG | 2AC | 2Y | 2U | 2Q | 2M | 2I | 2E | 2A |
| 2BF | 2BB | 2AX | 2AT | 2AP | 2AL | 2AH | 2AD | 2Z | 2V | 2R | 2N | 2J | 2F | 2B |
| 2BG | 2BC | 2AY | 2AU | 2AQ | 2AM | 2AI | 2AE | 2AA | 2W | 2S | 2O | 2K | 2G | 2C |
| 2BH | 2BD | 2AZ | 2AV | 2AR | 2AN | 2AJ | 2AF | 2AB | 2X | 2T | 2P | 2L | 2H | 2D |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1BE | 1BA | 1AW | 1AS | 1AO | 1AK | 1AG | 1AC | 1Y | 1U | 1Q | 1M | 1I | 1E | 1A |
| 1BF | 1BB | 1AX | 1AT | 1AP | 1AL | 1AH | 1AD | 1Z | 1V | 1R | 1N | 1J | 1F | 1B |
| 1BG | 1BC | 1AY | 1AU | 1AQ | 1AM | 1AI | 1AE | 1AA | 1W | 1S | 1O | 1K | 1G | 1C |
| 1BH | 1BD | 1AZ | 1AV | 1AR | 1AN | 1AJ | 1AF | 1AB | 1X | 1T | 1P | 1L | 1H | 1D |



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**Open circuit**

- If there is no continuity in the following wiring harnesses, there is an open circuit. Repair or replace the wiring harness.
  - — Front HO2S terminal 1A and PCM terminal 2AD
  - — Front HO2S terminal 1B and PCM terminal 2AC
  - — Front HO2S terminal 1C and PCM terminal 2Z
  - — Front HO2S terminal 2A and PCM terminal 2M
  - — Front HO2S terminal 2B and main relay terminal E
  - — Front HO2S terminal 2C and PCM terminal 2Y
  - — Front HO2S terminal 2D and PCM terminal 2C

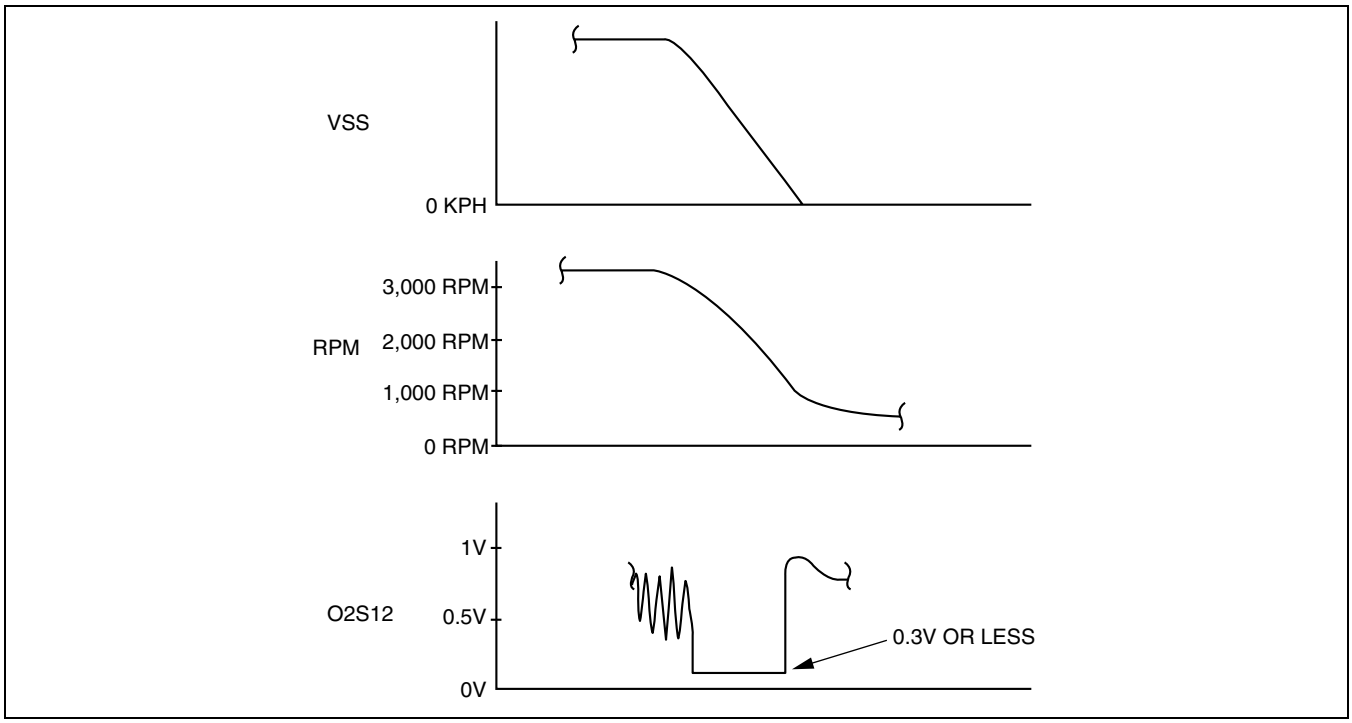
**Short circuit**

- If there is continuity in the following wiring harnesses, there is a short circuit. Repair or replace the wiring harness.
  - — Front HO2S terminal 1A and body ground
  - — Front HO2S terminal 1A and power supply
  - — Front HO2S terminal 1B and body ground
  - — Front HO2S terminal 1B and power supply
  - — Front HO2S terminal 1C and body ground
  - — Front HO2S terminal 1C and power supply
  - — Front HO2S terminal 2A and power supply
  - — Front HO2S terminal 2B and body ground
  - — Front HO2S terminal 2C and body ground
  - — Front HO2S terminal 2C and power supply
  - — Front HO2S terminal 2D and body ground
  - — Front HO2S terminal 2D and power supply

**Rear HO2S Voltage Inspection**

1. Warm up the engine to normal operating temperature.
2. Using the M-MDS, monitor the following:
   - — Vehicle speed (PID: VSS)
   - — Engine speed (PID: RPM)
   - — Rear HO2S voltage (PID: O2S12)
3. Drive the vehicle and decelerate the engine speed by releasing the accelerator pedal fully when the engine speed is **3,000 rpm or more.**

4. Verify that the rear HO2S outputs a voltage of **0.6 V or more**, one time or more, then verify that the rear HO2S voltage (PID: O2S12) is **0.3 V or less** while decelerating as shown in the figure.

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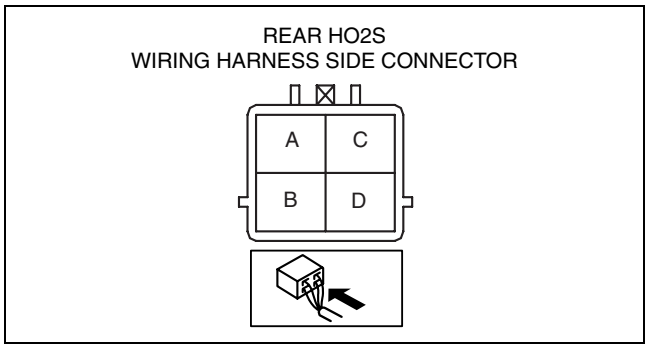
- If not within the specification, inspect the HO2S for an open or short circuit. (See01-40-40 Rear HO2S Circuit Open/Short Inspection (Sensor).) Then if there is no malfunction in the wiring harness, replace the rear HO2S.

**Rear HO2S Circuit Open/Short Inspection (Sensor)**

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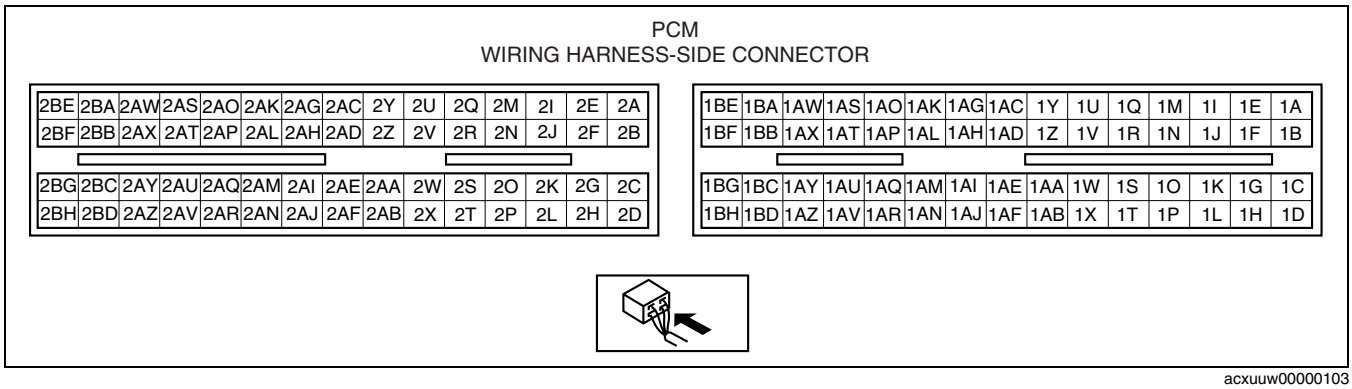


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1. Disconnect the PCM connector.
2. Disconnect the rear HO2S connector.
3. Inspect the following wiring harnesses for an open or short circuit. (Continuity inspection)

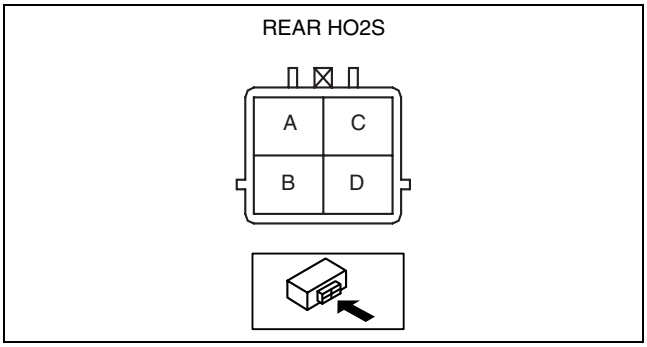
**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Rear HO2S terminal A and PCM terminal 2Q
  - — Rear HO2S terminal B and PCM terminal 1BC

**Short circuit**
- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — Rear HO2S terminal A and body ground
  - — Rear HO2S terminal A and power supply
  - — Rear HO2S terminal B and power supply

**Rear HO2S Heater Resistance Inspection**

1. Disconnect the rear HO2S connector.
2. Measure the rear HO2S resistance between terminals C and D.
   - If not within the specification, replace the HO2S.

   **Rear HO2S heater resistance**
   **2— 50 ohms**

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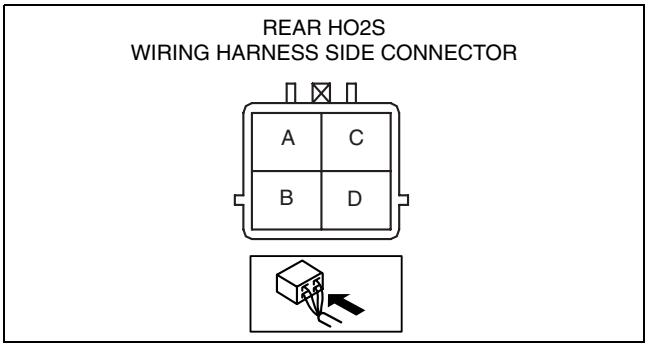
**Rear HO2S Circuit Open/Short Inspection (Heater)**

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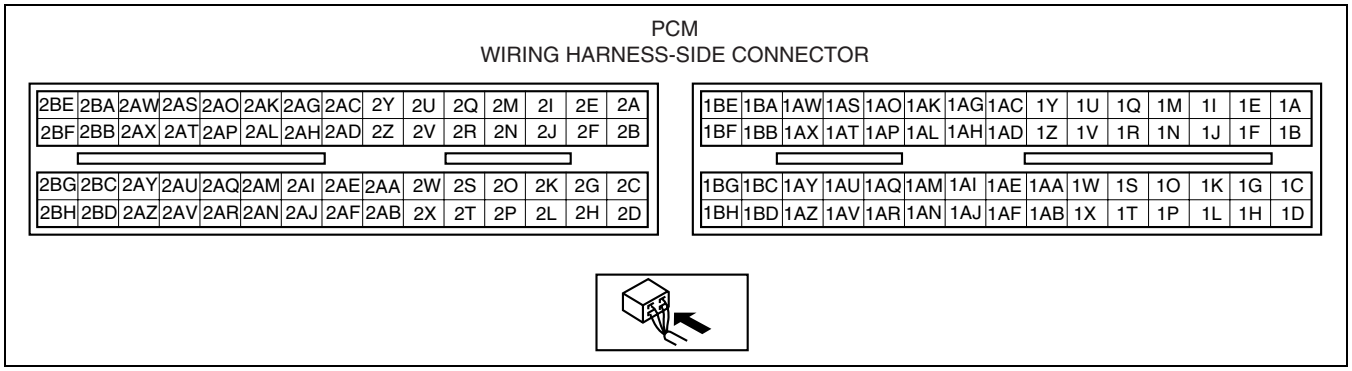


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1. Disconnect the PCM connector.
2. Disconnect the rear HO2S connector.
3. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — Rear HO2S terminal C and ignition switch
  - — Rear HO2S terminal D and PCM terminal 2D

**Short circuit**
- If there is no continuity, there is a short circuit. Repair or replace the wiring harness.
  **Rear**
  - — Rear HO2S terminal A and body ground
  - — Rear HO2S terminal B and power supply
  - — Rear HO2S terminal B and body ground

## CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC]

id014039800600

### Removal

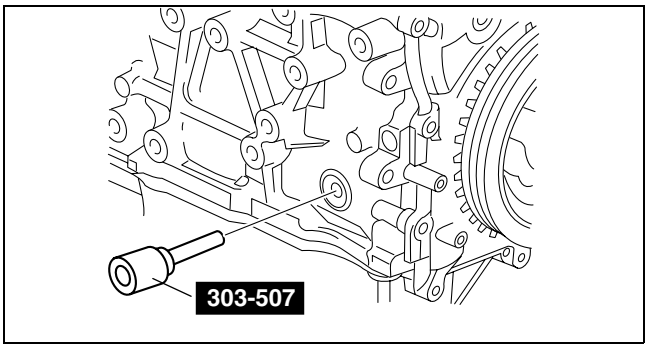
1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Remove the splash shield (RH).
5. Disconnect the CKP sensor connector.
6. Remove the installation bolts to remove the CKP sensor.

### Installation

**Caution**

- **When foreign material, such as an iron chips, gets on the CKP sensor, it can cause abnormal output from the sensor because of flux turbulence and adversely affect engine control. Be sure there is no foreign material on the CKP sensor when replacing.**

1. Perform the following procedure so that piston No.1 is at the top dead center.
   (1) Rotate the crankshaft in the direction of the engine rotation and remove the cylinder block lower blind plug when the No. 1 cylinder is at the point prior to top dead center (TDC) of compression, then install the SST.
   (2) Rotate the crankshaft in the direction of the engine rotation so that the No.1 piston is at TDC of the compression stroke. (Until the crank weight contacts SST and stops.)

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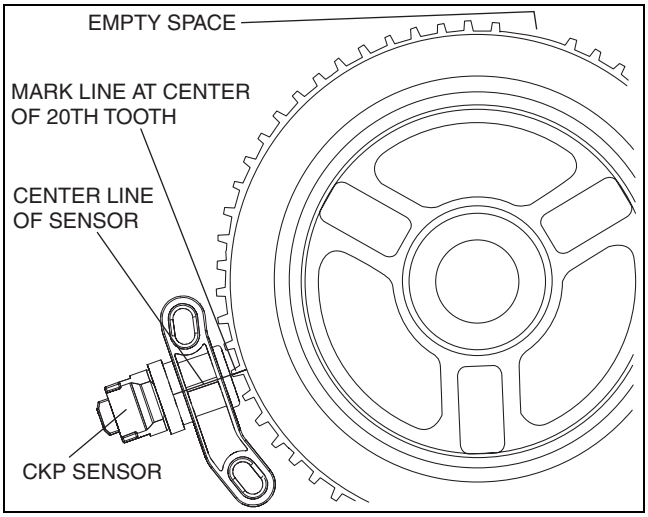
2. Using a straight edge, draw a straight line directly in the center of the twentieth tooth of the crankshaft pulley pulse wheel (counting counterclockwise from the empty space).

**Caution**

- **If the line is not accurately drawn, ignition timing, fuel injection and other engine control systems will be adversely effected. Draw the straight line carefully using a straight edge.**

3. Align the center line of the crankshaft position sensor and the line drawn in Step 2, then install the sensor.
4. Install the CKP sensor fitting bolts.

**Tightening torque**
**5.5— 7.5 N·m {57— 76 kgf·cm, 49— 66 in·lbf}**

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5. Remove the **SST** then install the cylinder block lower blind plug.

**Tightening torque**
**18— 22 N·m {1.9— 2.2 kgf·m, 14— 16 ft·lbf}**

## CRANKSHAFT POSITION (CKP) SENSOR INSPECTION[L3 WITH TC]

id014039800500

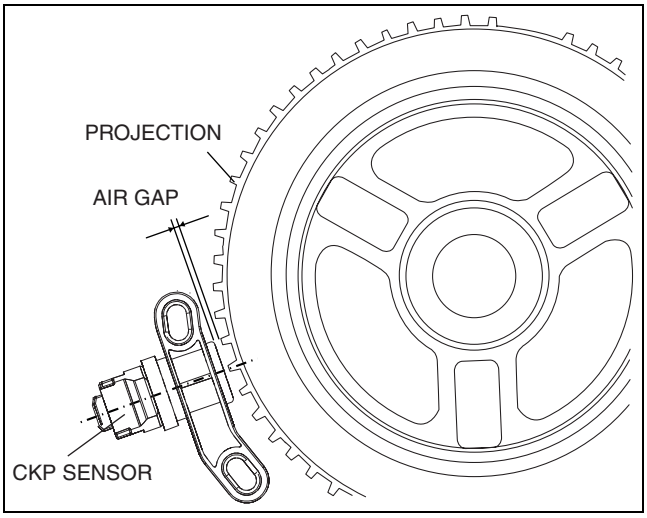
**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)



### Air Gap Inspection

1. Verify that the CKP sensor is securely installed.
2. Using a thickness gauge, measure the air gap between the plate projections at the back of crankshaft pulley and the CKP sensor.
   - If not within the specification, inspect the plate projections for cracks or bending.
     — If there is any malfunction, replace the plate.
     — If the monitor item condition/specification (reference) is not within the specification, even though there is no malfunction, carry out the “Circuit Open/Short Inspection”.

**Air gap**
**0.5— 1.5 mm {0.02— 0.05 in}**

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### Visual Inspection

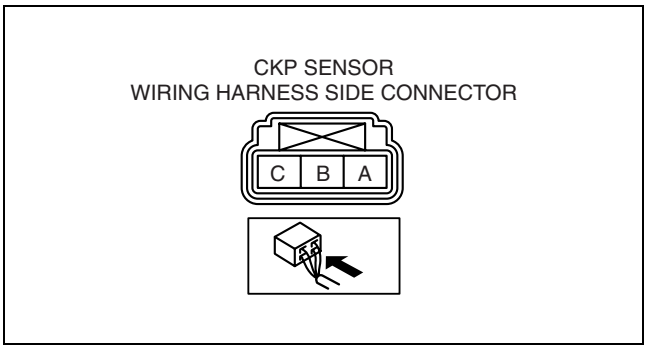
1. Disconnect the negative battery cable.
2. Remove the CKP sensor. (See01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/ INSTALLATION[L3 WITH TC].)
3. Verify that there are no metal shavings on the sensor.
   - If the monitor item condition/specification (reference) is without the specification even though there is no malfunction, carry out the “Circuit Open/Short Inspection”.

### Voltage Inspection

1. Idle the engine.

**Caution**
- **Water penetrating the connector will cause sensor malfunction. To prevent this, be careful not to damage the wiring harnesses or the waterproof connector so as to cause water penetration.**

2. Measure the output voltage using an oscilloscope.
   - If not within the specification, replace the CKP sensor.
   - If the monitor item condition/specification (reference) is without the specification, even though the voltage is within the specification, carry out the “Circuit Open/Short Inspection”.

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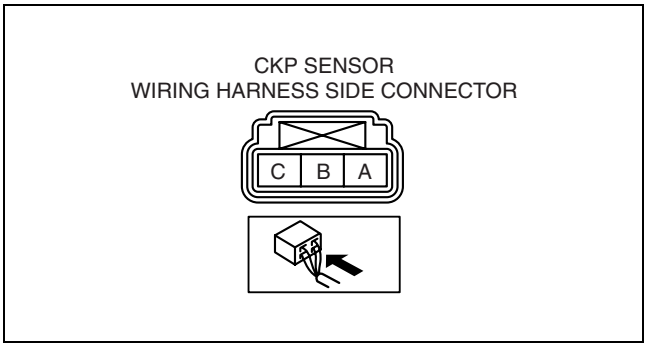
**Voltage**

| Terminal | Voltage (V) | Condition |
|---|---|---|
| A | Below 1.0 | Under any condition |
| B | 4.8 or more | High output* |
| | 0.8 or less | Low output* |
| C | B+ | Under any condition |

* : Output voltage varies with crankshaft rotation.

**Circuit Open/Short Inspection**

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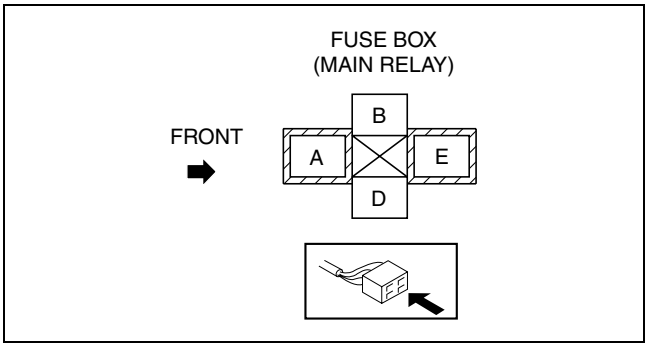


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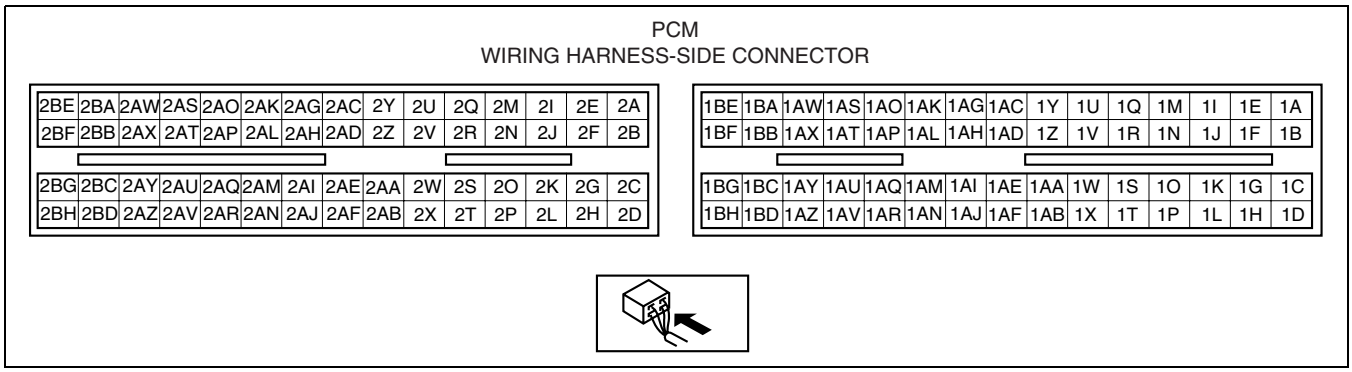


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1. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**

- If there is no continuity, the circuit is open. Repair or replace the wiring harness.
  - — CKP sensor terminal A and PCM terminal 2P
  - — CKP sensor terminal B and PCM terminal 2W
  - — CKP sensor terminal C and main relay terminal E

**Short circuit**

- If there is continuity, the circuit is shorted. Repair or replace the wiring harness.
  - — CKP sensor terminal A and power supply
  - — CKP sensor terminal B and power supply
  - — CKP sensor terminal B and body ground
  - — CKP sensor terminal C and body ground

## CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC]

id014039801500

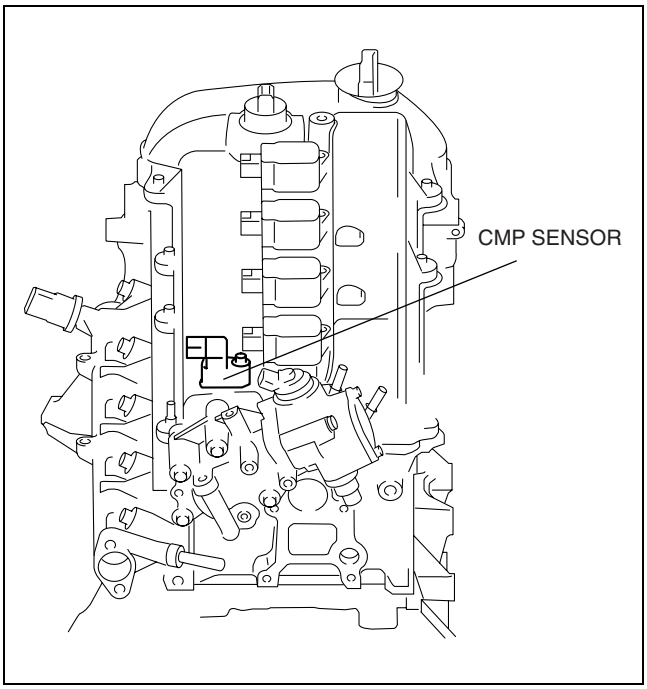
**Caution**

- **When replacing the CMP sensor, make sure there is no foreign material on it such as metal shavings. If it is installed with foreign material, the sensor output signal will malfunction resulting from fluctuation in magnetic flux and cause a deterioration in engine control.**

1. Disconnect the negative battery cable.
2. Remove the charge air cooler duct. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the charge air cooler cover. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Disconnect the CMP sensor connector.
5. Remove the CMP sensor installation bolt.
6. Remove the CMP sensor from the cylinder head cover.
7. Install in the reverse order of removal.

**Tightening torque**

**5.5— 7.5 N·m {57— 76 kgf·cm, 49— 66 in·lbf}**

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## CAMSHAFT POSITION (CMP) SENSOR INSPECTION[L3 WITH TC]

id014039801400

**Note**

- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

**Visual Inspection**

1. Disconnect the negative battery cable.
2. Remove the CMP sensor. (See01-40-45 CAMSHAFT POSITION (CMP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
3. Verify that there are no metal shavings on the sensor.
   - If the monitor item condition/specification (reference) is not within the specification even though there is no malfunction, carry out the “Circuit Open/Short Inspection”.

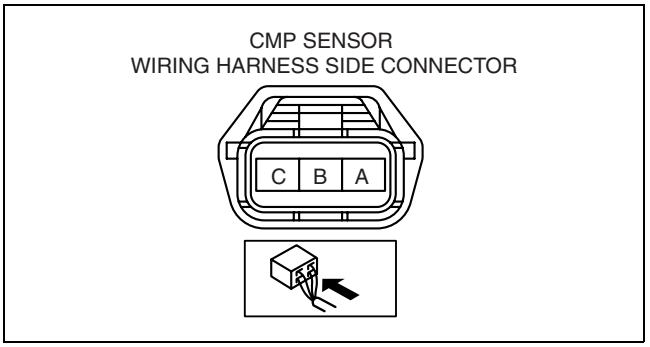
**Voltage Inspection**

1. Idle the engine.

**Caution**

- **Water penetrating the connector will cause sensor malfunction. To prevent this, be careful not to damage the wiring harnesses or the waterproof connector so as to cause water penetration.**

2. Measure the output voltage using an oscilloscope.
   - If not within the specification, replace the CMP sensor.
   - If the monitor item condition/specification (reference) is not within the specification, even though the voltage is within the specification, carry out the “Circuit Open/ Short Inspection”.



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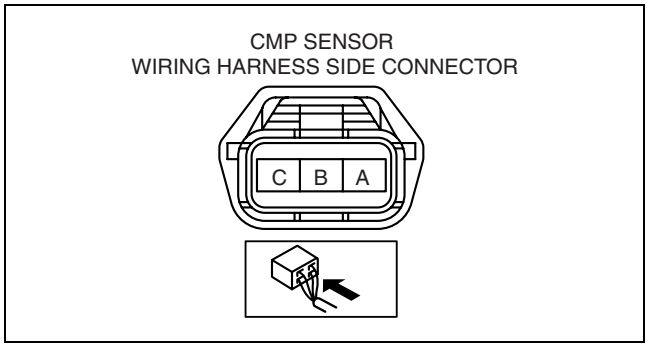
**Voltage**

| Terminal | Voltage (V) | Condition |
|---|---|---|
| A | B+ | Under any condition |
| B | Below 1.0 | Under any condition |
| C | 4.8 or more | High output* |
| | 0.8 or less | Low output* |

* : Output voltage varies with camshaft rotation.

**Circuit Open/Short Inspection**



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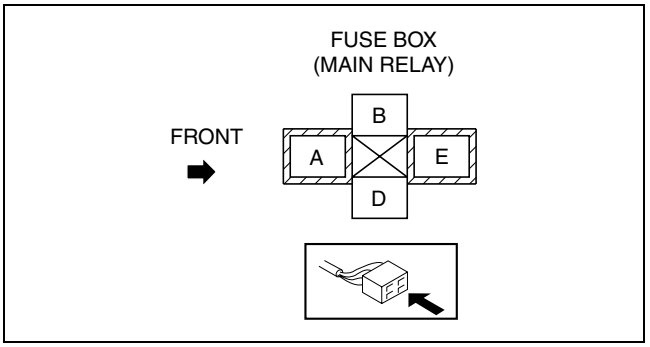

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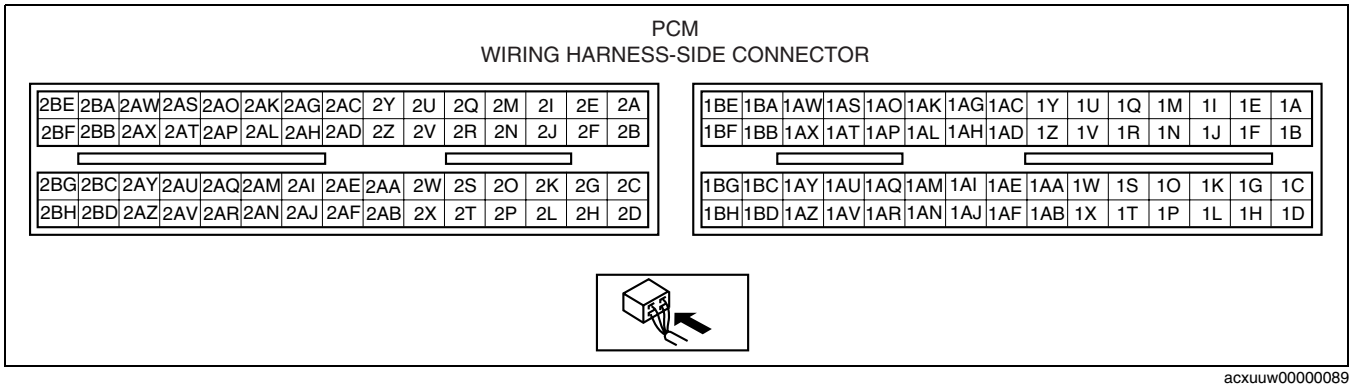

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1. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**
- If there is no continuity, the circuit is open. Repair or replace the wiring harness.
  - — CMP sensor terminal A and main relay terminal E
  - — CMP sensor terminal B and PCM terminal 2P
  - — CMP sensor terminal C and PCM terminal 2S

**Short circuit**
- If there is continuity, the circuit is shorted. Repair or replace the wiring harness.
  - — CMP sensor terminal A and body ground
  - — CMP sensor terminal B and power supply
  - — CMP sensor terminal C and body ground
  - — CMP sensor terminal C and power supply

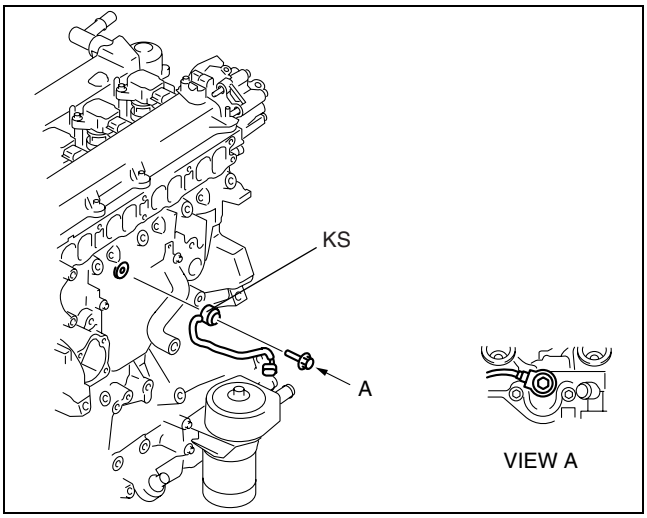
## KNOCK SENSOR (KS) REMOVAL/INSTALLATION[L3 WITH TC]

id014039802900

**Caution**
- **Be careful not to impact the sensor.**
- **Verify that there is no debris between the sensor and the cylinder block before installing.**

1. Disconnect the negative battery cable.
2. Remove the intake manifold. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
3. Remove the KS attachment bolt to remove the KS.
4. Install in the reverse order of removal.

**Tightening torque**
**16— 24 N·m {1.7— 2.4 kgf·m, 12— 17 ft·lbf}**

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## KNOCK SENSOR (KS) INSPECTION[L3 WITH TC]

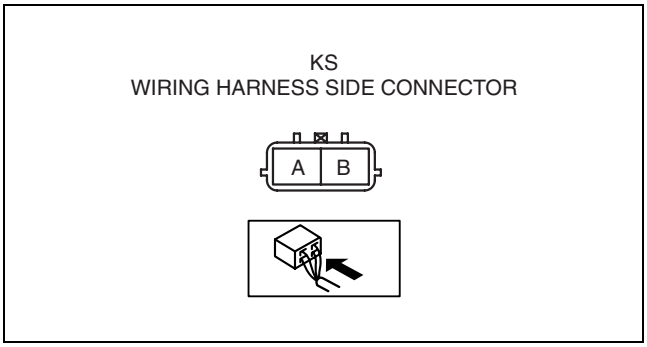
id014039802800

**Note**
- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See 00-00-3 HOW TO USE THIS MANUAL.)

**Resistance Inspection**
1. Turn the ignition switch to the LOCK position.
2. Disconnect the KS connector.
3. Measure the resistance between KS terminals A and B using a tester.
   - If not as specified, replace the KS. (See01-40-47 KNOCK SENSOR (KS) REMOVAL/INSTALLATION[L3 WITH TC].)
   - If the KS is normal, but the PID value is out of specification, perform the “Circuit Open/Short Inspection”.

**Specification**
**Approx. 4.87 megohms**

**Circuit Open/Short Inspection**

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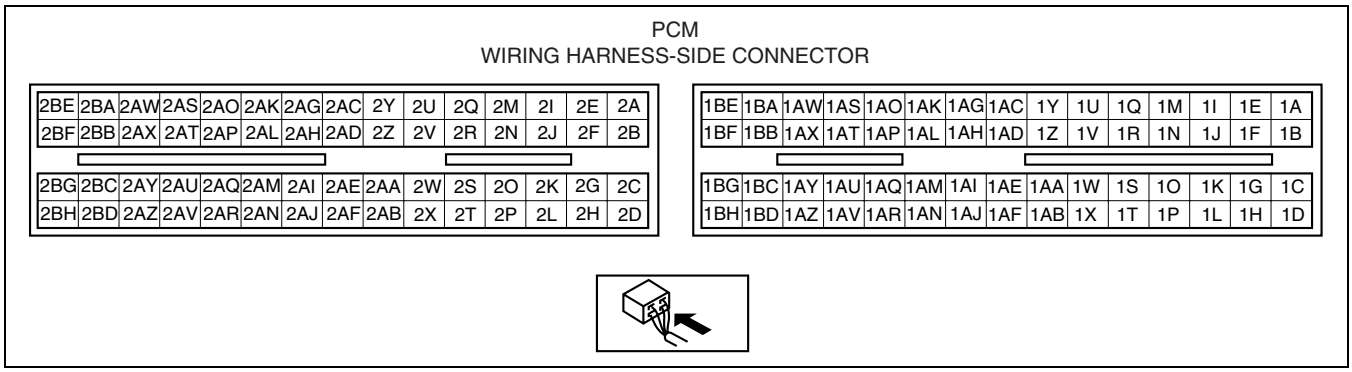


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1. Disconnect the PCM connector. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Inspect the following wiring harnesses for an open or short circuit. (Continuity check)

**Open circuit**

- If there is no continuity, there is an open circuit. Repair or replace the wiring harness.
  - — KS terminal A and PCM terminal 2U
  - — KS terminal B and PCM terminal 2V

**Short circuit**

- If there is continuity, there is a short circuit. Repair or replace the wiring harness.
  - — KS terminal A and power supply
  - — KS terminal A and body ground
  - — KS terminal B and power supply
  - — KS terminal B and body ground

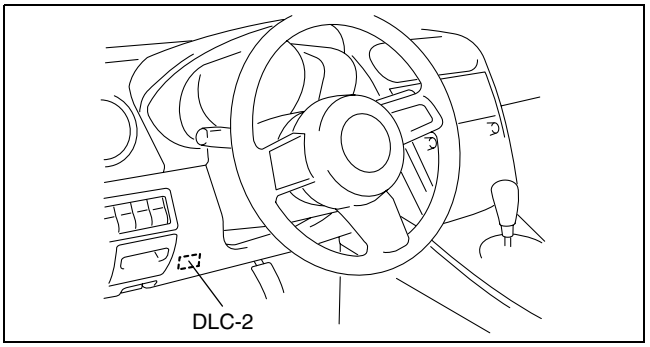
**BAROMETRIC PRESSURE (BARO) SENSOR INSPECTION[L3 WITH TC]**

id014039801100

**Note**

- Before performing the following inspection, make sure to follow the procedure as indicated in the troubleshooting flowchart. (See00-00-3 HOW TO USE THIS MANUAL.)

1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position.
3. Select BARO on the M-MDS.
4. Verify that the BARO PID (pressure) and barometric pressure are practically equal.
   - If not as verified, replace the PCM. (See01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)

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# 01-50 TECHNICAL DATA [L3 WITH TC]

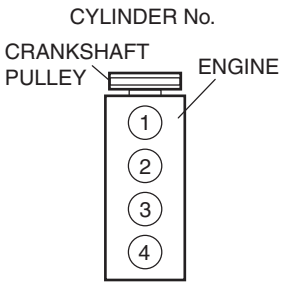
**ENGINE TECHNICAL DATA [L3 WITH TC] . . . . . 01-50–1**

## ENGINE TECHNICAL DATA[L3 WITH TC]



id015039800100

| Item | Specification |
|---|---|
| Standard valve clearance [Engine cold] | IN: 0.22—0.28 mm {0.0087—0.011 in}<br>EX: 0.27—0.33 mm {0.011—0.012 in} |
| Compression | Standard:1,280 kPa {13.1 kgf/cm$^2$, 185.65 psi}[250rpm]<br>Minimum:896 kPa {9.14 kgf/cm$^2$, 129.96 psi}[250rpm]<br>Maximum difference between cylinders:196.1 kPa {2.0 kgf/cm$^2$, 28.5 psi} |
| Cylinder head bolt length | Standard<br>144.7—145.3 mm {5.697—5.720 in}<br>Maximum:<br>146 mm {5.74 in} |
| Front oil seal press-in amount | 0—0.5 mm {0—0.019 in} |
| OCV resistance | 6.9—7.9 ohms [20°C {68°F}] |
| Ignition timing | Approx. BTDC 10° |
| Idle speed (P, N position) | No load: 650—750 rpm<br>Electrical load on[*1]: 650—750 rpm<br>P/S operation: 650—750 rpm<br>A/C operation: 650—750 rpm |
| Idle speed (D position) | No load: 575—675 rpm<br>Electrical load on[*1]: 600—700 rpm<br>P/S operation: 650—750 rpm<br>A/C operation: 650—750 rpm |
| Idle mixture | HC concentration: Within the regulation<br>CO concentration: Within the regulation |
| Oil pressure (reference value) [oil temperature: 100 °C {212 °F}] | 297—551 kPa {3.03—5.61 kgf/cm$^2$, 43.1—79.9 psi} [3,000 rpm] |
| Engine oil capacity (approx. quantity) | Oil replacement: 5.3 L {5.6 US qt, 4.7 Imp qt}<br>Oil and oil filter replacement: 5.7 L {6.0 US qt, 5.0 Imp qt}<br>Total (dry engine): 6.4 L {6.8 US qt, 5.6 Imp qt} |
| Engine coolant capacity (approx. quantity) | 9.0 L {9.5 US qt, 7.9 Imp qt} |
| Cooling fan motor No.1, No.2 standard current | 17.5—22.5 A |
| Cooling system cap valve opening pressure | 112.8—142.2 kPa {1.15—1.45 kgf/cm$^2$, 16.4—20.6 psi} |
| Thermostat initial-opening temperature | 80—84 °C {176—183 °F} |
| Thermostat full-open temperature | 97 °C {207 °F} |
| Thermostat full-open lift | More than 8.0 mm {0.31 in} |
| Fuel line pressure | 410—490 kPa {4.2—4.9 kgf/cm$^2$, 60—71 psi} |
| Fuel pump hold pressure | More than 230 kPa {2.3 kgf/cm$^2$, 33 psi} |
| Fuel injector resistance | 1.0—1.2 ohms [20 °C {68 °F}] |
| Battery electrolyte specific gravity [20 °C {68 °F}] | 1.22—1.29 |
| Battery load test current | 55D23L (48): 180 A<br>80D26L (55): 195 A |
| Battery back-up current | Vehicles with immobilizer system: 55—65 mA<br>Vehicles without immobilizer system: 60 mA or less |
| Battery slow charge current | 55D23L (48): 4.5—5.5 A<br>80D26L (55): 5.5—6.5 A |
| Battery quick charge current [30 min] | 55D23L (48): 30 A<br>80D26L (55): 35 A |
| Generator standard voltage [IG-ON] | Terminal B: B+<br>Terminal P: Approx. 1 V or less<br>Terminal D: Approx. 0 V |

| Item | Specification |
|---|---|
| Generator standard voltage [Idle, 20 °C {68 °F}] | Terminal B: 13—15 V<br>Terminal P: Approx. 3—8 V<br>Terminal D: Turn the electrical loads (headlights, blower motor, rear window defroster) on and verify that the voltage reading increases. |
| Generator generated current minimum value | 70 % of the nominal output current (nominal output current: 110 A) [Ambient temp. 20 °C {68 °F}, voltage 13.0—15.0 V, both engine and generator are hot] |
| Generator rotor resistance (between slip rings) [20 °C {68 °F}] | 1.8—2.2 ohm |
| Generator brush length | Standard: 22.5 mm {0.89 in}<br>Minimum: 5.0 mm {0.20 in} |
| Generator brush spring force | Standard: 4.1—5.3 N {0.42—0.54 kgf, 0.92—1.19 lbf}<br>Minimum: 1.7 N {0.17 kgf, 0.38 lbf} |
| Firing order | 1— 3— 4— 2 (all cylinders independent firing)<br>  |
| Spark plug type | L3K9 18 110A, L3Y3 18 110 |
| Spark plug gap | 0.7—0.8 mm {0.028—0.031 in} |
| Spark plug resistance [25°C {77 °F}] | 3.0—7.5 kilohms |
| Starter no-load test voltage | 11 V |
| Starter no-load test current | 90 A or less |
| Starter pinion gap | 0.5—2.0 mm {0.02—0.07 in} |
| Starter armature runout | 0.05 mm {0.002 in} max. |
| Starter commutator diameter | Standard: 29.4 mm {1.16 in}<br>Minimum: 28.8 mm {1.13 in} |
| Segment groove depth of starter commutator | Standard: 0.4—0.6 mm {0.016—0.023 in}<br>Minimum: 0.2 mm {0.008 in} |
| Starter brush length | Standard: 12.3 mm {0.48 in}<br>Minimum: 7.0 mm {0.28 in} |
| Starter brush spring force | Standard: 18.3—24.9 N {1.87—2.53 kgf, 4.12—5.59 lbf}<br>Minimum: 5.9 N {0.6 kgf, 1.3 lbf} |

*1 : When the following electrical loads are on: Headlights, rear defroster, cooling fan No.1, cooling fan No.2, and the blower motor (2-step or more.)

**Engine oil specification**

| Item | U.S.A. and CANADA | Except U.S.A. and CANADA |
|---|---|---|
| Engine oil grade | <br>(ILSAC) | <br> <br>(ILSAC)<br>API SL or ILSAC |
| Engine oil viscosity | 5W-30 | |

# 01-60 SERVICE TOOLS [L3 WITH TC]

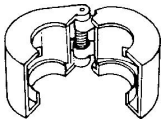
**ENGINE SST[L3 WITH TC]. . . . . 01-60–1**

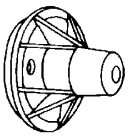
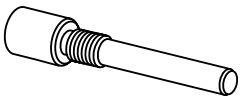
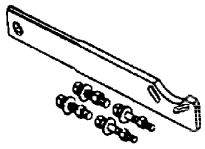
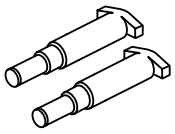
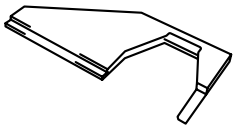
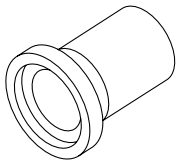
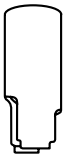
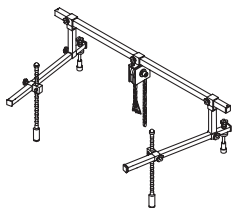
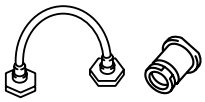
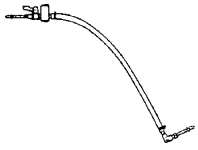
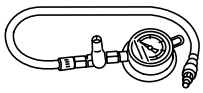
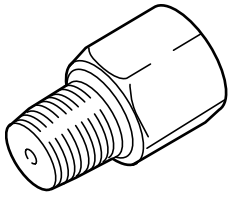
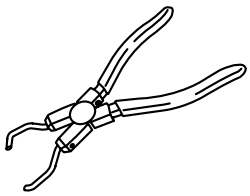
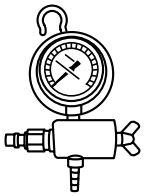
## ENGINE SST[L3 WITH TC]

id016039800100

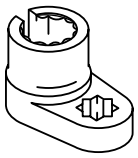
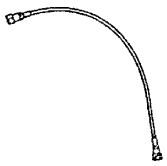
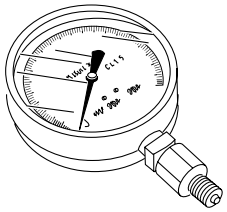
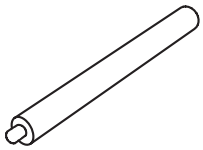


1: Mazda SST number
2: Global SST number
**Example**

| | |
|---|---|
| 1:49 UN01 052<br>2:310–D005<br><br>Spring lock coupler tool (green) |  |

| | | |
|---|---|---|
| 1:49 UN30 3328<br>2:303–328<br><br>Rear oil seal replacer | 1:–<br>2:303–507<br><br>Crankshaft TDC timing peg | 1:–<br>2:205-126<br><br>Holding tool |
|  |  |  |
| 1:–<br>2:205–072–02<br><br>Crankshaft holding tool pins | 1:49 UN30 310610<br>2:303–1061<br><br>Camshaft alignment timing tool | 1:49 H010 401<br>2:–<br><br>Oil seal installer |
|  |  |  |
| 1:49 G013 101<br>2:–<br><br>Remover | 1:49 C017 5A0<br>2: –<br><br>Engine support set | 1:49 9200 145<br>2:–<br><br>Radiator cap tester adapter set |
|  |  |  |
| 1:49 N013 101A<br>2:–<br><br>Body (Components part of 49 N013 1A0D) | 1:49 0187 280A<br>2:–<br><br>Oil pressure gauge | 1:49 E019 001<br>2:–<br><br>Adapter |
|  |  |  |
| 1:49 E042 001<br>2:–<br><br>Remover | 1:–<br>2:134-01049<br><br>Evaporative emission system tester | 1:49 H080 740A<br>2: –<br><br>Pressure tester |
|  | |  |

# SERVICE TOOLS [L3 WITH TC]

| | | |
|---|---|---|
| 1:49 L018 001<br>2:–<br><br>O2 sensor wrench  | 1:49 N013 102A<br>2:–<br><br>Adapter Hose (Components part of 49 N013 1A0D)  | 1:49 B019 901B<br>2:–<br><br>Gauge (Components part of 49 N013 1A0D)  |
| 1:49 G040 001<br>2:–<br><br>Handle  | 1:49 G040 002<br>2:–<br><br>Installer | — |

# SUSPENSION

# 02
SECTION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## 02-02 ON-BOARD DIAGNOSTIC


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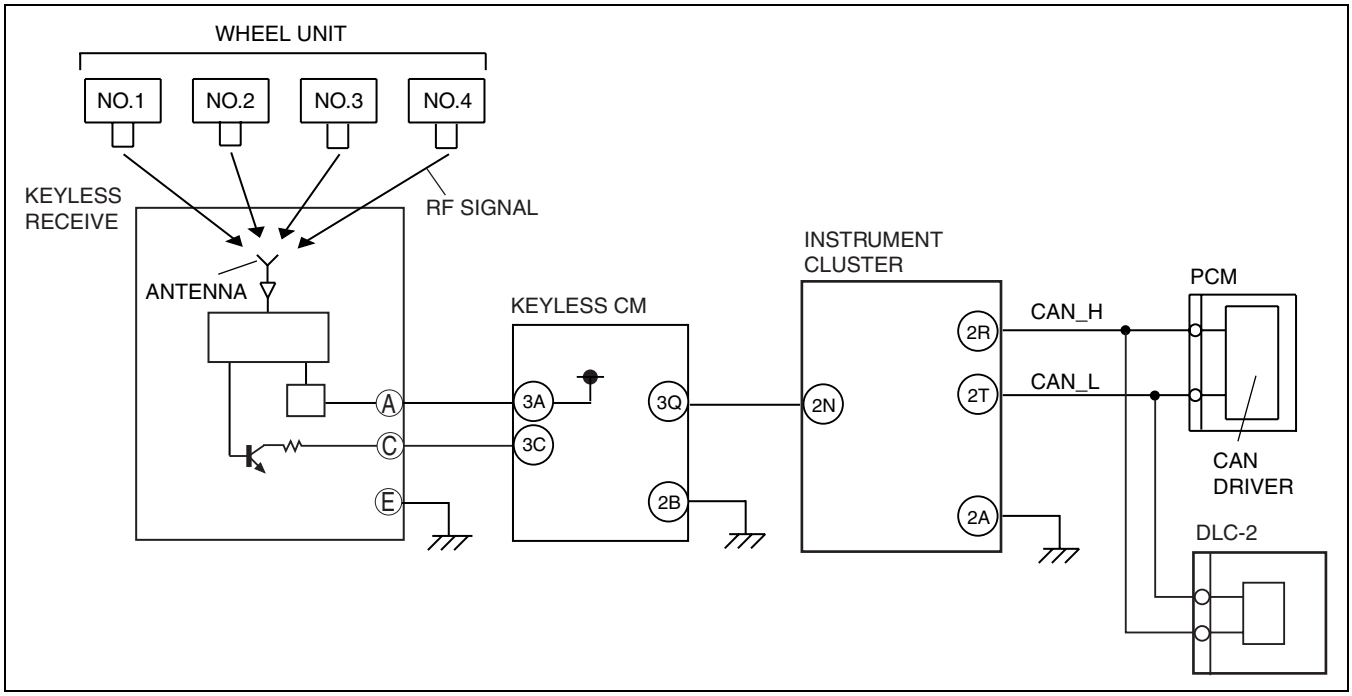
## TIRE PRESSURE MONITORING SYSTEM (TPMS) WIRING DIAGRAM

id020200800100

### With Advanced Keyless System

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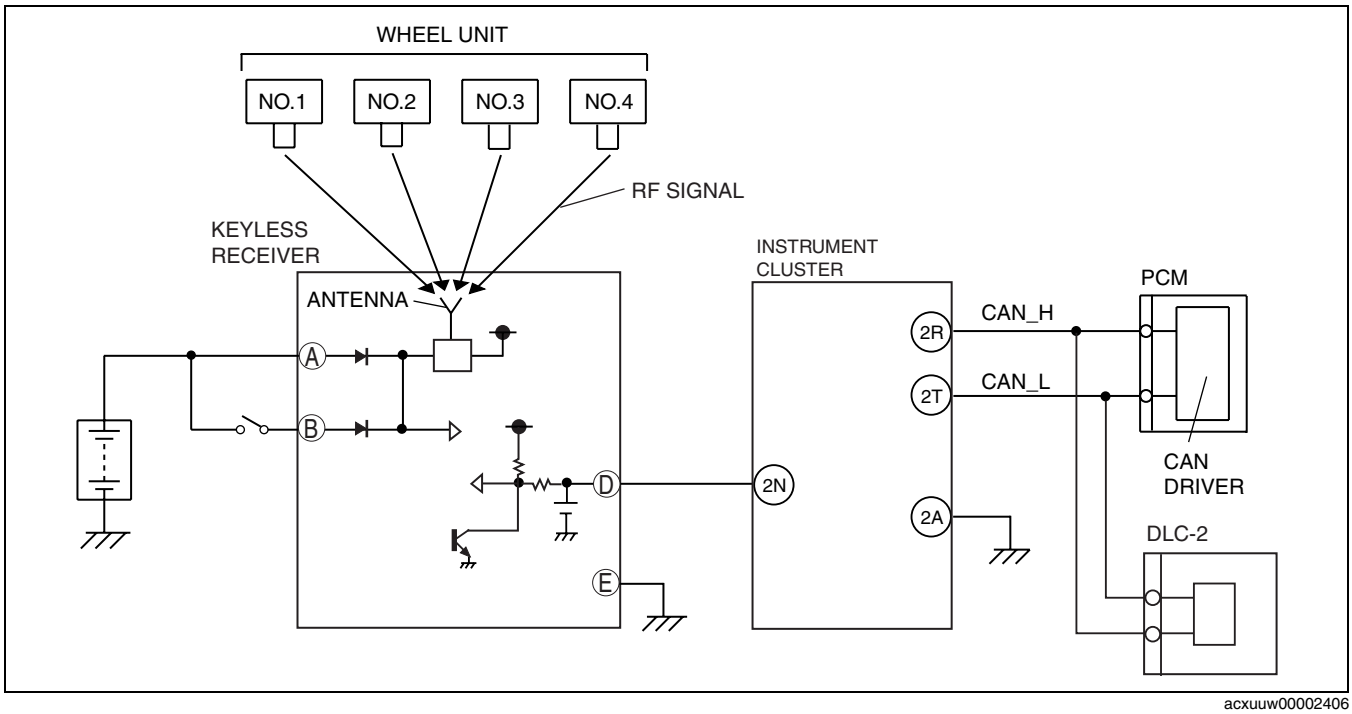
### With Keyless Entry System

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## TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS

id020200800200

### On-Board Diagnostic (OBD) Test Description

- The OBD test inspects the integrity and function of the TPMS and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  - — Provides a quick inspection of the TPMS usually performed at the start of each diagnostic procedure.
  - — Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  - — Read/clear diagnostic results, PID monitor and active command mode.



### Read/clear diagnostic results

- This function allows you to read or clear DTCs in the instrument cluster memory.

### PID/Data monitor and record

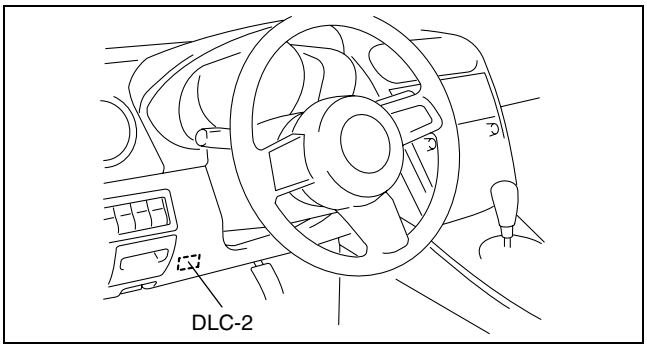
- This function allows you to access certain data values, input signals, calculated values, and system status information.

### Active command modes

- This function allows you to control devices through the M-MDS.

### Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “IC”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DCTs stored in the TPMS. (See 02-02-3 Clearing DTCs Procedures.)

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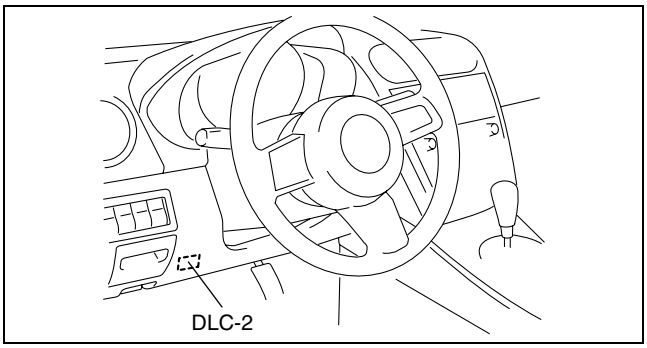
### Clearing DTCs Procedures

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “IC”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTCs are displayed.

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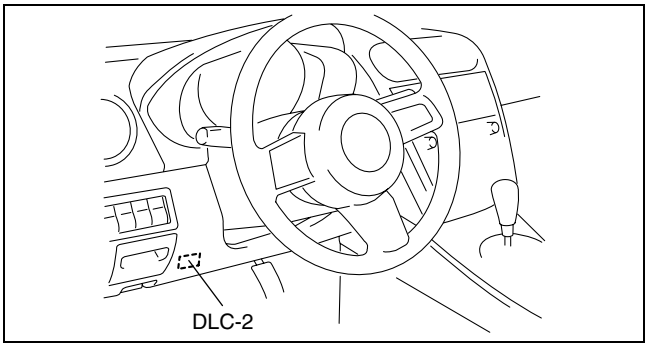
**PID/Data Monitor and Record Procedure**

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “IC”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.



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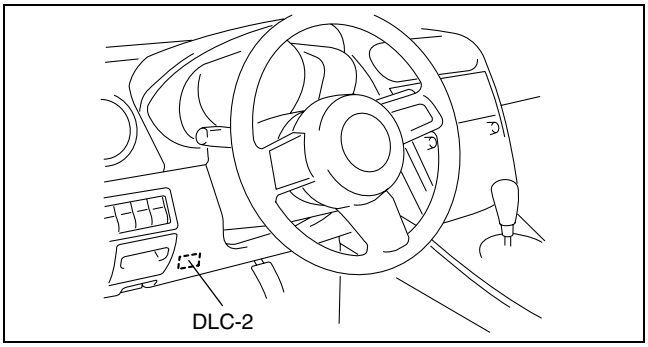
**Note**

- The PID/Data monitor function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually using a active command modes function.

**Active Command Modes Procedure**

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “IC”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “IC”.
     3. Select “DataLogger”.
3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
   - If there is no operation sound from the relay, motor, and solenoid after the active command mode inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.



acxuuw00001190

**Freeze Frame PID Data Access Procedure**

1. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - This function is available for only the IDS (notebook PC)
     1. Select the “Body” tab.
     2. Select “TPMS Functions”.
     3. Select “Freeze Frame Data”.

**DTC Table**

| DTC<br>M-MDS | Description | Page |
|---|---|---|
| B1342 | Instrument cluster internal malfunction | (See 09-02E-5 DTC B1342[INSTRUMENT CLUSTER].) |
| B2143 | ID registration failure | (See 02-02-8 DTC B2143.) |
| B2477 | Instrument cluster configuration not performed | (See 09-02E-5 DTC B2477[INSTRUMENT CLUSTER].) |
| B2868 | Wheel unit No.1 internal malfunction | (See 02-02-8 DTC B2868, B2869, B2870, B2871.) |
| B2869 | Wheel unit No.2 internal malfunction | (See 02-02-8 DTC B2868, B2869, B2870, B2871.) |
| B2870 | Wheel unit No.3 internal malfunction | (See 02-02-8 DTC B2868, B2869, B2870, B2871.) |
| B2871 | Wheel unit No.4 internal malfunction | (See 02-02-8 DTC B2868, B2869, B2870, B2871.) |
| U0127 | Communication failure between instrument cluster and keyless receiver | (See 02-02-9 DTC U0127.) |
| U2616 | Wheel unit No.1 (No response) | (See 02-02-11 DTC U2616, U2617, U2618, U2619.) |
| U2617 | Wheel unit No.2 (No response) | (See 02-02-11 DTC U2616, U2617, U2618, U2619.) |
| U2618 | Wheel unit No.3 (No response) | (See 02-02-11 DTC U2616, U2617, U2618, U2619.) |
| U2619 | Wheel unit No.4 (No response) | (See 02-02-11 DTC U2616, U2617, U2618, U2619.) |

**PID/DATA Monitor Table**

| PID Name (Definition) | Unit/ Condition | Condition/Specification | Action |
|---|---|---|---|
| AI_WU1_ID<br>AI_WU2_ID<br>AI_WU3_ID<br>AI_WU4_ID<br>(Wheel unit ID code (during ID registration)) | – | Indicates the wheel unit ID code. (During wheel unit ID registration.) | • Replace the wheel unit.<br>• Perform the wheel unit ID registration. |
| AI_WU1_P<br>AI_WU2_P<br>AI_WU3_P<br>AI_WU4_P<br>(Tire pressure value (during ID registration)) | Pa/psi | Indicates the tire pressure. (During ID registration.) | • Adjust tire pressure.<br>• Replace the wheel unit.<br>• Perform the wheel unit ID registration. |
| FFD1_WU1_P<br>FFD1_WU2_P<br>FFD1_WU3_P<br>FFD1_WU4_P<br>(Tire pressure value (freeze frame PID data 1)) | Pa/psi | Indicates the tire pressure. (Freeze frame PID data 1) | Adjust tire pressure. |
| FFD2_WU1_P<br>FFD2_WU2_P<br>FFD2_WU3_P<br>FFD2_WU4_P<br>(Tire pressure value (freeze frame PID data 2)) | Pa/psi | Indicates the tire pressure. (Freeze frame PID data 2) | Adjust tire pressure. |
| FFD1_WU1_T<br>FFD1_WU2_T<br>FFD1_WU3_T<br>FFD1_WU4_T<br>(Internal tire air temperature value (freeze frame PID data 1)) | °C/°F | Indicates the internal tire air temperature. (Freeze frame PID data 1) | Adjust tire pressure. |

| PID Name (Definition) | Unit/ Condition | Condition/Specification | Action |
|---|---|---|---|
| FFD2_WU1_T<br>FFD2_WU2_T<br>FFD2_WU3_T<br>FFD2_WU4_T<br>(Internal tire air temperature value (freeze frame PID data 2)) | °C/°F | Indicates the internal tire air temperature. (Freeze frame PID data 2) | Adjust tire pressure. |
| FFD1_MLG<br>(Wheel unit mileage value (freeze frame PID data 1)) | m/mi (ft) | Indicates the mileage. (Freeze frame PID data 1) | Adjust tire pressure. |
| FFD2_MLG<br>(Wheel unit mileage value (freeze frame PID data 2)) | m/mi (ft) | Indicates the mileage. (Freeze frame PID data 2) | Adjust tire pressure. |
| FFD1_SPD<br>(Wheel unit speed value (freeze frame PID data 1)) | KPH/MPH | Indicates the speed. (Freeze frame PID data 1) | Adjust tire pressure. |
| FFD2_SPD<br>(Wheel unit speed value (freeze frame PID data 2)) | KPH/MPH | Indicates the speed. (Freeze frame PID data 2) | Adjust tire pressure. |
| IC_DTC_CNT<br>(Number of continuous DTCs) | – | Indicates number of DTC | Perform the DTC inspection. |
| ID_LAST*<br>(Last received tire transmitter ID code value) | – | Indicates the last ID that is transmitted from the wheel unit. | • Replace the wheel unit.<br>• Perform the configuration. |
| ID_WU1*<br>ID_WU2*<br>ID_WU3*<br>ID_WU4*<br>(Registered wheel unit ID code) | – | Indicates the registered ID that is transmitted from the wheel unit. | • Replace the wheel unit.<br>• Perform the wheel unit ID registration. |
| WU1_P*<br>WU2_P*<br>WU3_P*<br>WU4_P*<br>(Tire pressure value) | Pa/psi | Indicates the tire pressure. (See 02-50-1 SUSPENSION TECHNICAL DATA.) | • Adjust tire pressure.<br>• Replace the wheel unit. |
| WU1_T*<br>WU2_T*<br>WU3_T*<br>WU4_T*<br>(Internal tire air temperature value) | °C/°F | Indicates the internal tire air temperature. | Replace the wheel unit. |

* : Data transmission from the wheel unit occurs when the vehicle speed is **25 km/h {15.5 mph} or more.** Due to this, the current air pressure and temperature data can only be displayed after the vehicle is driven at **25 km/h {15.5 mph} or more.** Also, the ID_LAST, and tire pressure and internal tire air temperature data are erased when the instrument cluster connector and the battery terminal are disconnected. If the instrument cluster is replaced or the battery terminals are disconnected, drive the vehicle at **25 km/h {15.5 mph} or more** and display the tire pressure PID after the data transmission.

**Active Command Modes Table**

| Command Name | Definition | Operation | Note |
|---|---|---|---|
| IDR_MODE | Wheel unit ID registration mode | ON/OFF | Ignition switch at ON |

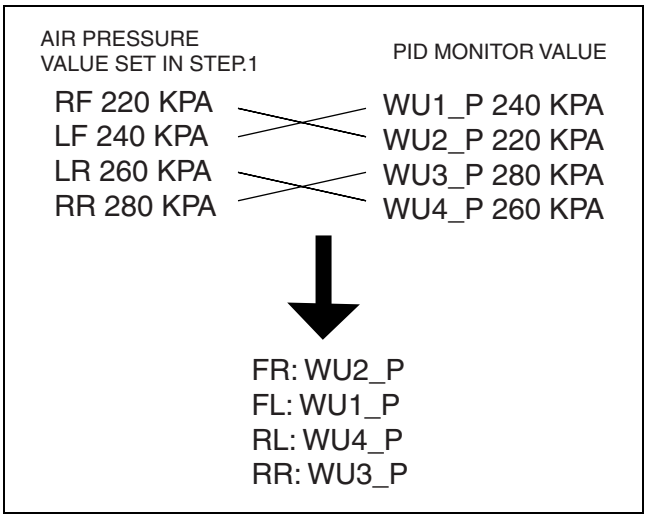
## MALFUNCTIONING WHEEL UNIT IDENTIFICATION

id020200800300

**Note**

- The tire pressure monitoring system (TPMS) does not identify the location of the malfunctioning wheel unit on the vehicle (RF, LF, LR, RR). The TPMS identifies each wheel unit as No.1, No.2, No.3 and No.4. In order to identify the location of the wheel unit, perform the following procedure.

1. Adjust the air pressure as follows:
   - RF: 220 kPa {2.2 kgf/cm$^2$, 32 psi}
   - LF: 240 kPa {2.4 kgf/cm$^2$, 35 psi}
   - LR: 260 kPa {2.6 kgf/cm$^2$, 38 psi}
   - RR: 280 kPa {2.8 kgf/cm$^2$, 40 psi}
2. Turn the ignition switch off.
3. Connect the M-MDS to the DLC-2.
4. Turn the ignition switch to the ON position.
5. Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **2 min or more.**
6. Select the following PIDs using the M-MDS, and monitor them.
   - WU1_P
   - WU2_P
   - WU3_P
   - WU4_P
7. Determine which wheel unit identification code matches which wheel and tire by comparing the PID monitor values with the air pressure values set in Step 1.
8. Select the ID_LAST PID using the M-MDS, and take a note of four displayed identification codes.
9. Inspect the DTCs using the M-MDS.

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### DTC B2143

id020200800400

| | |
|---|---|
| **DTC B2143** | • **ID registration failure** |
| **DETECTION CONDITION** | • Two or more codes are overlapping. |
| **POSSIBLE CAUSE** | • ID registration procedure has not been performed properly. |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY THE PROGRAMMED ID**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Select the following PIDs using the M-MDS:<br>— ID_WU1<br>— ID_WU2<br>— ID_WU3<br>— ID_WU4<br>• Turn the ignition switch to the ON position.<br>• Is the same code in the output ID? | Yes | Register the wheel unit ID, then go to the next step. (See 02-12-4 WHEEL UNIT ID REGISTRATION.) |
| | | No | Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)<br>• Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more.**<br>• Is the same DTC present? | Yes | • Repeat the inspection from Step 1. If the malfunction recurs, replace the instrument cluster and/or wheel unit. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 02-12-4 WHEEL UNIT REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 3 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are there any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

### DTC B2868, B2869, B2870, B2871

id020200800500

| | | |
|---|---|---|
| **DTC** | **B2868**<br>**B2869**<br>**B2870**<br>**B2871** | **Wheel unit No.1 (internal malfunction)**<br>**Wheel unit No.2 (internal malfunction)**<br>**Wheel unit No.3 (internal malfunction)**<br>**Wheel unit No.4 (internal malfunction)** |
| **DETECTION CONDITION** | • The instrument cluster receives error signals from the wheel unit. | |
| **POSSIBLE CAUSE** | • Internal malfunction of wheel unit | |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **IDENTIFY MALFUNCTIONING WHEEL UNIT**<br>• (See 02-02-7 MALFUNCTIONING WHEEL UNIT IDENTIFICATION.) | | • Identify the malfunctioning wheel unit.<br>• Replace and register the wheel unit. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)<br>• Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)<br>• Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more.**<br>• Is the same DTC present? | Yes | Go to Step 1. |
| | | No | Go to the next step. |
| 3 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are there any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

## DTC U0127

id020200800600

| | |
|---|---|
| **DTC U0127** | • **Communication failure between instrument cluster and keyless receiver** |
| **DETECTION CONDITION** | • The instrument cluster cannot receive signal from the keyless CM or keyless receiver. |
| **POSSIBLE CAUSE** | **With advanced keyless system**<br>• Open or short circuit in the wiring harness between the keyless CM terminal 3Q and the instrument cluster terminal 2N.<br>• Keyless control module malfunction.<br>• Instrument cluster malfunction.<br>• Poor connection at connectors (female terminal)<br>**With keyless entry system**<br>• Open or short circuit in the wiring harness between the keyless receiver terminal D and the instrument cluster terminal 2N.<br>• Keyless receiver malfunction.<br>• Instrument cluster malfunction.<br>• Poor connection at connectors (female terminal) |



### With Advanced Keyless System
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT WHEEL UNIT SIGNAL FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Disconnect keyless CM and instrument cluster connectors.<br>• Inspect for continuity between keyless CM terminal 3Q (harness-side) and instrument cluster terminal 2N (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit between keyless CM terminal 3Q and instrument cluster terminal 2N, then go to Step 5. |
| 2 | **INSPECT WHEEL UNIT SIGNAL FOR SHORT TO POWER**<br>• Turn the ignition switch off.<br>• Disconnect keyless CM and instrument cluster connectors.<br>• Measure the voltage between keyless CM terminal 3Q (harness-side) and ground.<br>• Is there B+? | Yes | Repair or replace the wiring harness for a short to power between keyless CM terminal 3Q and instrument cluster terminal 2N, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT WHEEL UNIT SIGNAL FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Disconnect keyless CM and instrument cluster connectors.<br>• Inspect for continuity between keyless CM terminal 3Q (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground between keyless CM terminal 3Q and instrument cluster terminal 2N, then go to the next step. |
| | | No | Go to the next step. |
| 4 | **INSPECT FOR KEYLESS CM MALFUNCTION**<br>• Turn the ignition switch off.<br>• Using the M-MDS, perform the DTC inspection for the keyless CM.<br>• Is any DTCs present? | Yes | Go to the applicable DTC inspection. (See 09-02C-3 DTC TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Turn the ignition switch to the ON position and drive the vehicle at a speed of 25 km/h {15.5 mph} or more**.**<br>• Clear the DTC from the memory. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)<br>• Is the same DTC present? | Yes | • If the malfunction recurs, replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)<br>• Configure the instrument cluster. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.)<br>• Register the wheel unit ID. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)<br>• Go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more.**<br>• Are there any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

**With Keyless Entry System**
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT WHEEL UNIT SIGNAL FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Disconnect keyless receiver and instrument cluster connectors.<br>• Inspect for continuity between keyless receiver terminal D (harness-side) and instrument cluster terminal 2V (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for an open circuit between keyless receiver terminal D and instrument cluster terminal 2N, then go to Step 4. |
| 2 | **INSPECT WHEEL UNIT SIGNAL FOR SHORT TO POWER**<br>• Turn the ignition switch off.<br>• Disconnect keyless receiver and instrument cluster connectors.<br>• Measure the voltage between keyless receiver terminal D (harness-side) and ground.<br>• Is there B+? | Yes | Repair or replace the wiring harness for a short to power between keyless receiver terminal D and instrument cluster terminal 2N, then go to Step 4. |
| | | No | Go to the next step. |
| 3 | **INSPECT WHEEL UNIT SIGNAL FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Disconnect keyless receiver and instrument cluster connectors.<br>• Inspect for continuity between keyless receiver terminal D (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a short to ground between keyless receiver terminal D and instrument cluster terminal 2N, then go to the next step. |
| | | No | Replace keyless receiver, then go to the next step. (See 09-14-36 KEYLESS RECEIVER REMOVAL/INSTALLATION.) |
| 4 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)<br>• Turn the ignition switch to the ON position and wait for **30 s.**<br>• Is the same DTC present? | Yes | • If the malfunction recurs, replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>• Configure the instrument cluster. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.)<br>• Register the wheel unit ID. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)<br>• Go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more.**<br>• Are there any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

### DTC U2616, U2617, U2618, U2619

id020200800700

| | | |
|---|---|---|
| DTC | U2616<br>U2617<br>U2618<br>U2619 | **Wheel unit No.1 (No response)**<br>**Wheel unit No.2 (No response)**<br>**Wheel unit No.3 (No response)**<br>**Wheel unit No.4 (No response)** |
| **DETECTION CONDITION** | • The keyless receiver has continuously not received a signal from the wheel unit for a certain period. | |
| **POSSIBLE CAUSE** | • Wheel unit identification code is not registered in the instrument cluster.<br>• No signal is received from the wheel unit.<br>• Wheel unit is not installed.<br>• Poor connection at connectors (female terminal). | |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY WHEEL UNIT IS INSTALLED TO EACH WHEEL**<br>• Are all four wheels equipped with a wheel unit? | Yes | Go to the Step 3. |
| | | No | • Install the wheel unit. (See 02-12-4 WHEEL UNIT REMOVAL/INSTALLATION.)<br>• Register the wheel unit ID. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)<br>• Go to the next step. |
| 2 | **INSPECT FOR DTCs**<br>• Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more.**<br>• Is the same DTC present? | Yes | Go to the next step. |
| | | No | With advanced keyless system: go to the Step 4.<br>With keyless entry system: go to the Step 5. |
| 3 | **IDENTIFY MALFUNCTIONING WHEEL UNIT**<br>• (See 02-02-7 MALFUNCTIONING WHEEL UNIT IDENTIFICATION.) | | • Identify the malfunctioning wheel unit.<br>• Replace the wheel unit. (See 02-12-4 WHEEL UNIT REMOVAL/INSTALLATION.)<br>• Register the wheel unit ID. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)<br>• Go to the Step 5. |
| 4 | **INSPECT FOR KEYLESS CM MALFUNCTION**<br>• Turn the ignition switch off.<br>• Using the M-MDS, perform the DTC inspection for the keyless CM.<br>• Is any DTCs present? | Yes | Go to the applicable DTC inspection. (See 09-02C-3 DTC TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)<br>• Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more.**<br>• Is the same DTC present? | Yes | • If the malfunction recurs, replace the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>• Configure the instrument cluster. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.)<br>• Register the wheel unit ID. (See 02-12-4 WHEEL UNIT ID REGISTRATION.)<br>• Go to the next step. |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are there any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

**Note**

- If the installed wheel unit ID number is known, verification of whether the instrument cluster is receiving data from the wheel unit can be easily confirmed using the following procedure:
  1. Drive the vehicle at **25 km/h {15.5 mph} or more,** and send data from the wheel unit.
  2. Select [ID_LAST] from the PID items, and monitor the data.
  3. Verification that the instrument cluster is receiving data is possible if the monitored ID number matches the installed wheel unit ID number.
- If the wheel unit has been newly replaced, the TPMS warning light may flashes before the ID registration is complete, and DTC U2616, U2617, U2618 and U2619 may be stored in the memory. In this case, re-implement the wheel unit ID registration, and after confirming that the TPMS warning light is no longer flashing, erase the DTC. If the TPMS warning light does not go out, a malfunction on any one of the wheel units may have occurred and the ID registration will not have been correctly performed. Repeat the diagnostic procedure from Step 1 and perform and inspection.

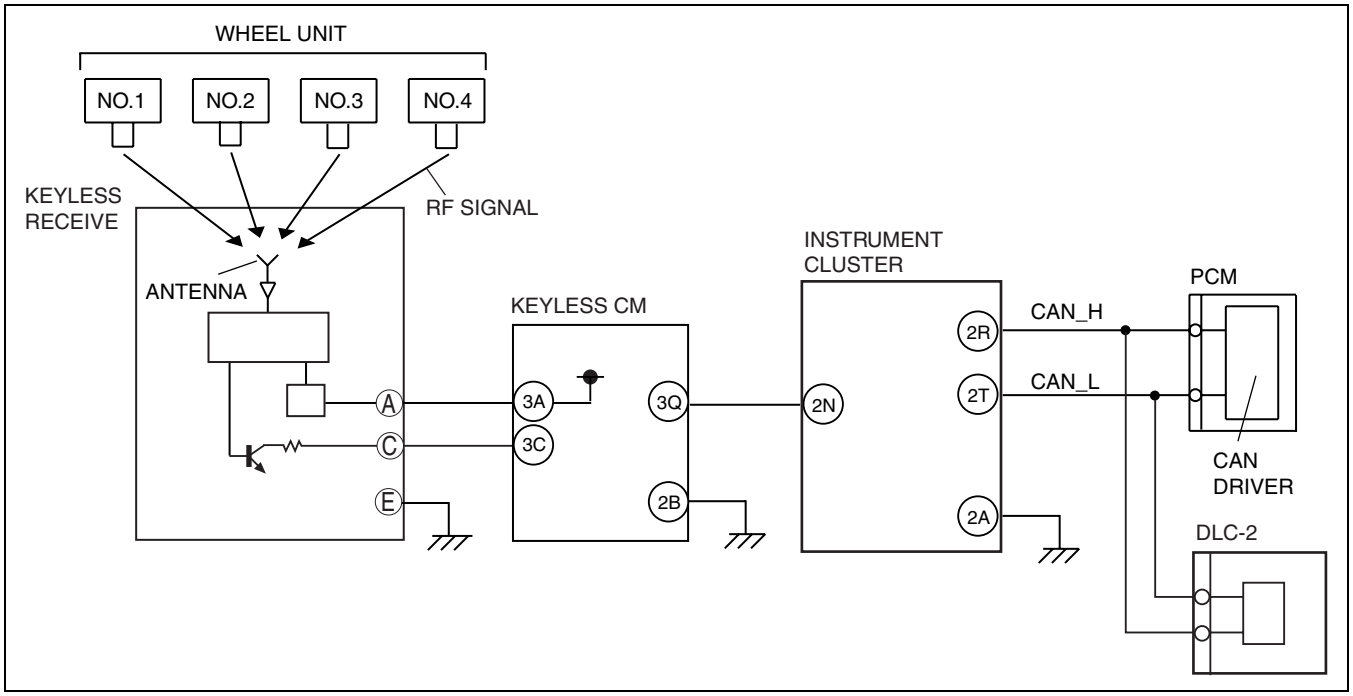
# 02-03 SYMPTOM TROUBLESHOOTING

**TIRE PRESSURE MONITORING SYSTEM (TPMS) WIRING DIAGRAM . . . . . 02-03–2**
With Advanced Keyless System. . . . . **02-03–2**
With Keyless Entry System . . . . . **02-03–2**
**FOREWORD . . . . . 02-03–2**
**PRECAUTION . . . . . 02-03–3**
Intermittent Concern Troubleshooting. . . . . **02-03–3**
**SYMPTOM TROUBLESHOOTING . . . . . 02-03–4**
**No.1 TPMS WARNING LIGHT ILLUMINATES CONTINUOUSLY . . . . . 02-03–4**
**No.2 TPMS WARNING LIGHT (LOW PRESSURE WARNING) ILLUMINATES AFTER ENGINE START AND TURNS OFF AFTER DRIVING FOR PERIOD OF TIME . . . . . 02-03–5**
**No.3 WHEEL UNIT ID REGISTRATION CANNOT BE PERFORMED (TPMS WARNING LIGHT FLASHES) . . 02-03–6**
Display Of M-MDS (Example) . . . . . **02-03–7**

## TIRE PRESSURE MONITORING SYSTEM (TPMS) WIRING DIAGRAM

id020300800100

### With Advanced Keyless System

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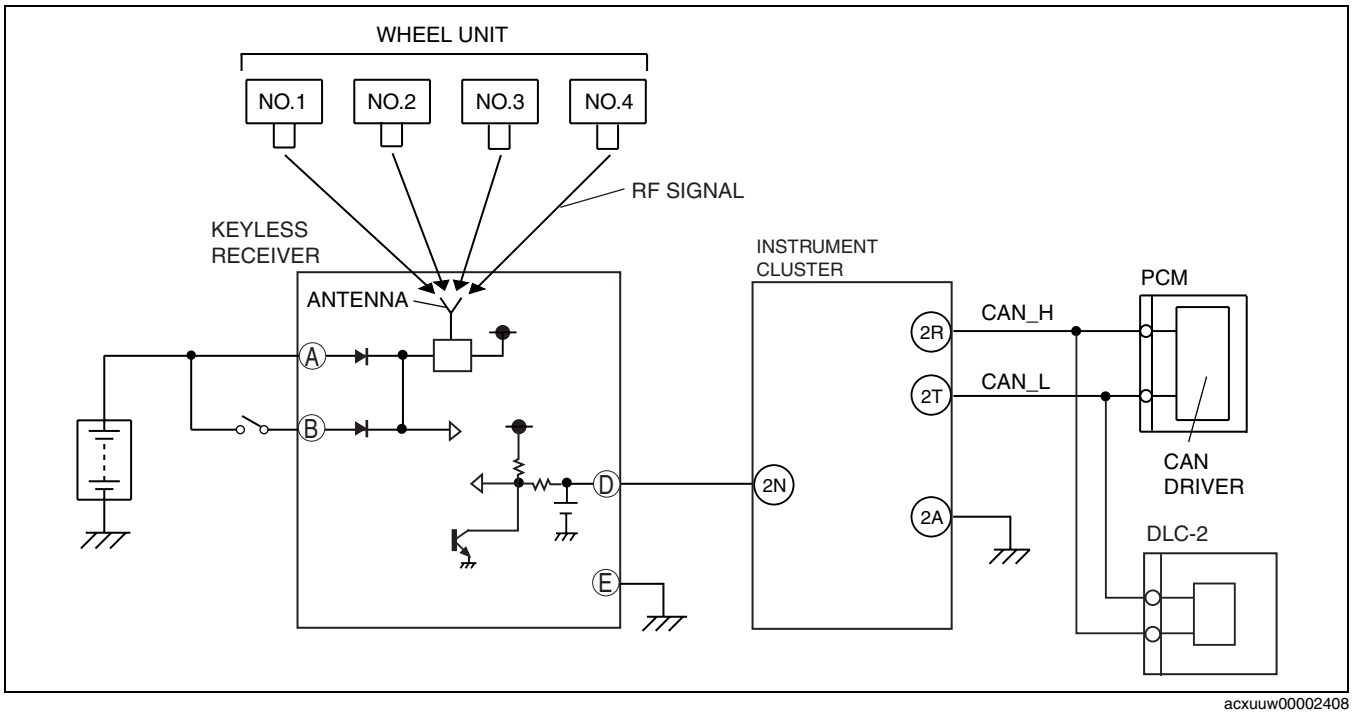
### With Keyless Entry System

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## FOREWORD

id020300800200

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps. (See 02-02-3 TIRE PRESSURE MONITORING SYSTEM (TPMS) ON-BOARD DIAGNOSIS.)

## PRECAUTION

id020300800300

### Intermittent Concern Troubleshooting

### Vibration method

- If malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the steps below.

**Note**

- There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Some of the things to check for are:
  - — Connectors not fully seated.
  - — Wire harnesses not having full play.
  - — Wires laying across brackets or moving parts.
  - — Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wire harnesses pass through the firewall, body panels and other panels are the major areas to be checked.



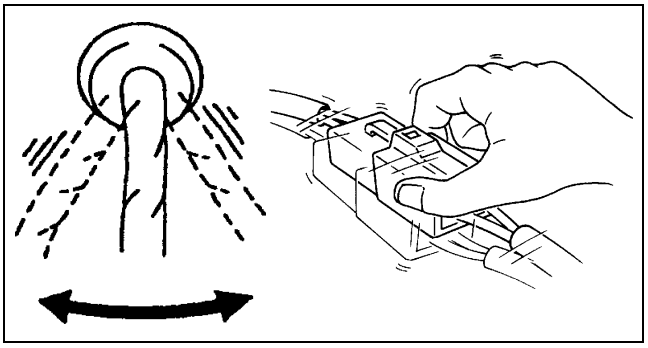
### Inspection method for switch and/or sensor connectors or wires

1. Connect M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

**Note**

- If engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Turn switch on manually.
5. Shake each connector or wire harness a bit vertically and horizontally while monitoring the PID.
   - If PID value is unstable, check for poor connection.



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### Inspection method for sensors

1. Connect M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

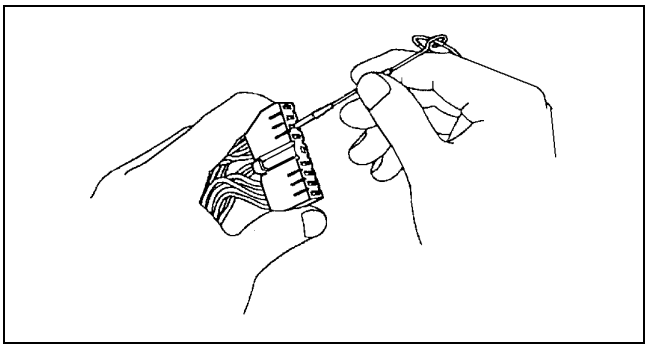
**Note**

- If engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If PID value is unstable or malfunction occurs, check for poor connection and/or poorly mounted sensor.

**Connector terminal check method**

1. Check the connection condition of each female terminal.
2. Insert male terminal; fit the female terminal side to female terminal and check to see whether the malfunction is in the female terminal or not.



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## SYMPTOM TROUBLESHOOTING

id020300800400

| No. | Symptom |
|---|---|
| 1 | TPMS warning light illuminates continuously. |
| 2 | TPMS warning light (low pressure warning) illuminates after engine start and turns off after driving for a period of time. |
| 3 | Wheel unit ID registration cannot be performed (TPMS warning light flashes). |

## No.1 TPMS WARNING LIGHT ILLUMINATES CONTINUOUSLY

id020300800500

**Caution**

- **The tire pressure cannot be measured accurately after driving for a long period due to the internal temperature and pressure. Stop the vehicle for approx. 1 hour and then perform the tire pressure measurement and adjustment.**
- **Use a high accuracy digital gauge for measurement of the tire pressure.**

**Note**

- If the DTC clearing procedure is implement, the TPMS warning light turns off.

| 1 | TPMS warning light illuminates continuously |
|---|---|
| **[TROUBLESHOOTING HINTS]**<br>• **Tire pressure is lower than the specification.** | |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT THE TIRE**<br>• Is there any foreign object adhering to the tire? | Yes | Remove any foreign object. Replace the tire if necessary, and then go to the next step. |
| | | No | Go to the next step. |
| 2 | **INSPECT THE TIRE PRESSURE**<br>• Is the tire pressure lower than the specification? | Yes | Adjust the tire pressure to the specification when the engine is cold, and then go tot the next step. |
| | | No | Go to the next step. |
| 3 | **DOES THE TPMS WARNING LIGHT TURN OFF?** | Yes | Troubleshooting completed. Explain to the customer what has been repaired. |
| | | No | Go to the next step. |
| 4 | **DRIVE THE VEHICLE AT 25 KM/H FOR 10 MIN.**<br>• Does the TPMS warning light turn off? | Yes | Troubleshooting completed. Explain to the customer what has been repaired. |
| | | No | Adjust the tire pressure to the specification, and then return to Step 1.<br>**Note**<br>• If the TPMS warning light does not turn off after repeating this step, the tire may be flat. |

## No.2 TPMS WARNING LIGHT (LOW PRESSURE WARNING) ILLUMINATES AFTER ENGINE START AND TURNS OFF AFTER DRIVING FOR PERIOD OF TIME

id020300800600

**Caution**

- **The tire pressure cannot be measured accurately after driving for a long period due to increased internal temperature and pressure. Stop the vehicle for approx. 1 hour and then perform the tire pressure measurement and adjustment.**
- **Use a high accuracy digital gauge for measurement of the tire pressure.**

**Note**

- The tire pressure normally decreases by **approx. 7 kPa {0.07 kgf/cm$^2$, 1.02 psi}** per month even if the tire is normal.
- The FFD (temperature and pressure) stored when the TPMS warning light is turned on or off can be verified by operating the M-MDS.



| | |
|---|---|
| 2 | **TPMS warning light (low pressure warning) illuminates after engine start and turns off after driving for a period of time.** |
| **[TROUBLESHOOTING HINTS]**<br>• The tire pressure decreases (approaches value to illuminate TPMS warning light) when the internal temperature of the tire is low. | |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT THE TIRE**<br>• Is there any foreign object adhering to the tire? | Yes | Remove any foreign object. Replace the tire if necessary, and then go to the next step. |
| | | No | Go to the next step. |
| 2 | **MEASURE THE TIRE PRESSURE WHEN THE ENGINE IS COLD**<br>• Has the tire pressure decreased (approaches value to illuminate TPMS warning light)? | Yes | Adjust the tire pressure to the specification, and then go to the next step. |
| | | No | Go to the next step. |
| 3 | **IS THE MALFUNCTION CORRECTED?** | Yes | Troubleshooting completed. |
| | | No | Verify troubleshooting again and return to Step 1 if the malfunction recurs. |

## No.3 WHEEL UNIT ID REGISTRATION CANNOT BE PERFORMED (TPMS WARNING LIGHT FLASHES)

id020300800900

**Caution**

- **Activate the wheel unit ID registration mode using the M-MDS, and perform the following steps if the TPMS warning light does not turn off after driving at 25 km/h {15.5 mph} or more for 10 min or more.**

| | |
|---|---|
| 4 | **Wheel unit ID registration cannot be performed (TPMS warning light flashes).** |

**[TROUBLESHOOTING HINTS]**

- New wheel unit malfunction (caused when installing to wheel)
- Any malfunction on an old wheel unit which has not been replaced.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **CAN THE WHEEL UNIT ID BE REGISTERED?**<br>• Connect the M-MDS.<br>• Display the wheel unit ID registration condition (ID and tire pressure table) using the M-MDS.<br>• Temporarily remove the battery and reinstall it immediately.<br>**Note**<br>• If the battery is removed, the tire pressure data for WU_1 to WU_4 stored in the instrument cluster is reset.<br>• Pressure is **0 kPa {0 kgf/cm$^2$, 0 psi}** when it is displayed again using the M-MDS.<br>• Set tire pressure for the four wheels separately.<br>• Perform the wheel unit ID registration again.<br>• Can the ID be registered? | Yes | Trouble shooting completed. (Adjust the tire pressure on four wheels, and then return the vehicle to the customer.) |
| | | No | Go to the next step. |
| 2 | **VERIFY THE WHEEL UNIT ID REGISTRATION CONDITIONS (ID AND TIRE PRESSURE TABLE) USING THE M-MDS**<br>• Refer to [M-MDS display (example)] to specify wheel unit for which the ID could not be registered. (See 02-03-7 Display Of M-MDS (Example).)<br>• Is the wheel unit for which the ID could not be registered a new wheel unit?<br>**Caution**<br>• **ID numbers of WU_1 to WU_4 are updated when wheel on all of four wheels are registered.** | Yes | Replace with a new wheel unit, and then go to Step 4. |
| | | No | Go to the next step. |
| 3 | Replace the old wheel unit, and then go tot the next step (any malfunction on an old wheel unit which has not been replaced). | | |
| 4 | **CAN THE WHEEL UNIT ID BE REGISTERED?**<br>• Perform the wheel unit ID registration using the M-MDS. | Yes | Troubleshooting completed. |
| | | No | Verify troubleshooting again and return to Step 1 if the malfunction recurs. |

**Display Of M-MDS (Example)**
Registered ID: 0xAAAAAAAA, 0xBBBBBBBB, 0xCCCCCCCC, and 0xDDDDDDDD (AAAAAAAA, BBBBBBBB, CCCCCCCC, and DDDDDDDD mean arbitrary numbers.)
Unregistered ID: 0x00000000
Tire pressure: aaa kPa, bbb kPa, ccc kPa, ddd kPa (aaa, bbb, ccc, and ddd mean measurement value.)
* The battery is removed, the stored tire pressure is reset to 0 kPa.

**Three registered wheel units and a replaced wheel unit**
**When a replaced wheel unit malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | bbb kPa | ccc kPa | 0 kPa |
| Tire Pressure (Candidate) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |

**When a registered wheel unit malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | bbb kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**When two registered wheel unit malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**When a replaced wheel unit and a registered wheel unit malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | bbb kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |

**When a replaced wheel unit and two registered wheel units malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |

**When three registered wheel units malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**Two registered wheel units and two replaced wheel units**
**When aa replaced wheel unit malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | bbb kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**When a registered wheel unit malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0xFFFFFFFF | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | fff kPa | 0 kPa | 0 kPa |

**When two replaced wheel units malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | bbb kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |

**When two registered wheel units malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0xFFFFFFFF | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | fff kPa | 0 kPa | 0 kPa |

**When a replaced wheel unit and a registered wheel unit malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**When two replaced wheel units and a registered wheel unit malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |

**When a replaced wheel unit and two registered wheel units malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**A registered wheel unit and three replaced wheel units**
**When a registered wheel unit malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0xFFFFFFFF | 0xGGGGGGGG | 0x00000000 |
| Tire Pressure (Stored) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | fff kPa | ggg kPa | 0 kPa |

**When a replaced wheel unit malfunctions**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0xFFFFFFFF | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | fff kPa | 0 kPa | 0 kPa |

**When a replaced wheel unit and a registered wheel unit malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0xFFFFFFFF | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | fff kPa | 0 kPa | 0 kPa |

**When two replaced wheel units malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**When two replaced wheel units and a registered wheel unit malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0xEEEEEEEE | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | eee kPa | 0 kPa | 0 kPa | 0 kPa |

**When three replaced wheel units malfunction**

| | WU_1 | WU_2 | WU_3 | WU_4 |
|---|---|---|---|---|
| ID Number (Stored) | 0xAAAAAAAA | 0xBBBBBBBB | 0xCCCCCCCC | 0xDDDDDDDD |
| ID Number (Candidate) | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| Tire Pressure (Stored) | aaa kPa | 0 kPa | 0 kPa | 0 kPa |
| Tire Pressure (Candidate) | 0 kPa | 0 kPa | 0 kPa | 0 kPa |

# 02-10 GENERAL PROCEDURES

**PRECAUTION (SUSPENSION). . . . . 02-10–1**
Wheels and Tires
Removal/Installation. . . . . **02-10–1**
Suspension Links
Removal/Installation. . . . . **02-10–1**
Brake Lines
Disconnection/Connection . . . . . **02-10–1**
Power Steering Components
Removal/Installation . . . . . **02-10–1**



## PRECAUTION (SUSPENSION)

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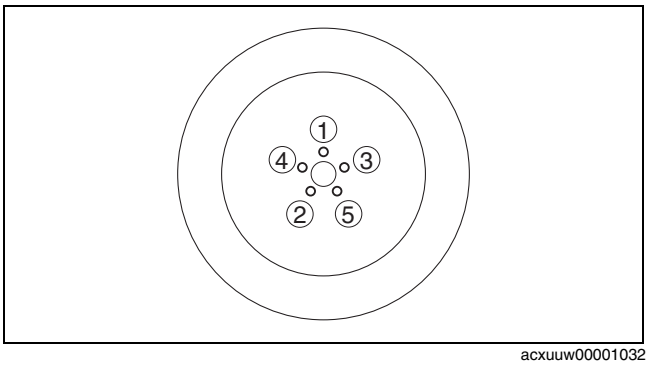
### Wheels and Tires Removal/Installation

1. When a wheel is installed, tighten it to **88.2— 117.6 N·m {9.00— 11.99 kgf·m, 65.06— 86.73 ft·lbf}.**

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### Suspension Links Removal/Installation

1. Tighten any part of the suspension that uses rubber bushings only after the vehicle has been lowered to the ground and unloaded.

**Note**
- Unloaded: Fuel tank is full. Engine coolant and engine oil are at specified levels. Spare tire, jack and tools are in designated position.

### Brake Lines Disconnection/Connection

**Caution**
- **Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.**

1. Tighten the brake pipe flare nut using the **SST (49 0259 770B)**. Be sure to modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-**SST** combination. (See 00-00-13 SERVICE CAUTIONS.)
2. If any brake line has been disconnected anytime during the procedure, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

### Power Steering Components Removal/Installation

1. If any steering fluid line has been disconnected, perform the following after installation of the power steering components.
   — Power steering fluid amount inspection
   — Power steering fluid leakage inspection
   — Air bleeding

**Power steering fluid**
**ATF (M-III or M-V, or equivalent (e.g. Dexron®II))**

# 02-11 WHEEL ALIGNMENT

**WHEEL ALIGNMENT**
**PRE-INSPECTION . . . . . 02-11–1**
**FRONT WHEEL ALIGNMENT . . . . . 02-11–2**
Steering Angle Adjustment . . . . . **02-11–2**
Camber and Caster Adjustment . . . . . **02-11–3**
Total Toe-in Adjustment . . . . . **02-11–3**
**REAR WHEEL ALIGNMENT . . . . . 02-11–4**
Total Toe-in Adjustment . . . . . **02-11–4**

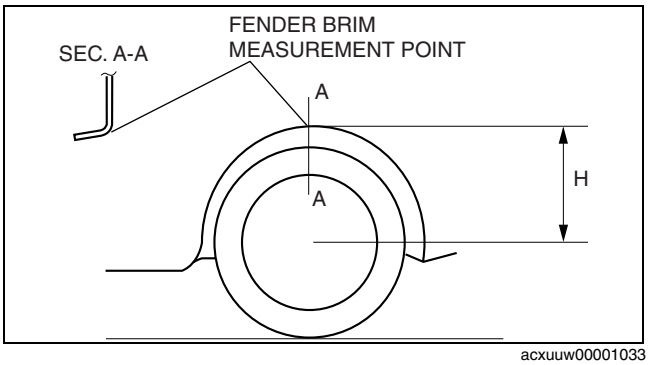


## WHEEL ALIGNMENT PRE-INSPECTION

id021100800100

1. Park the vehicle on a level ground, in an unloaded condition*, and with the wheels straight forward.
   *: Unloaded condition.....Fuel tank is full. Engine coolant and engine oil are at specified level. Spare tire, jack and tools are in designated position.
2. Inspect the tire pressure.
   - Adjust to the recommended pressure if necessary. (See 02-50-1 SUSPENSION TECHNICAL DATA.)
3. Inspect the wheel bearing play.
   - Correct if necessary. (See 03-11-2 WHEEL HUB, STEERING KNUCKLE INSPECTION.) (See 03-12-2 WHEEL HUB COMPONENT INSPECTION.)
4. Inspect the wheel runout.
   - Correct if necessary. (See 02-50-1 SUSPENSION TECHNICAL DATA.)
5. Rock the vehicle, and verify that there is no looseness in the steering wheel joint and suspension ball joint.
6. Rock the vehicle, and verify that the shock absorber operates properly.
7. Measure height H from the center of the wheel to the fender brim.
8. Verify that the difference between the left and right dimension H is within the specification.
   - If it exceeds the specification, repeat the Step 2— 7.

**Standard**
**10 mm {0.39 in} or less**

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## FRONT WHEEL ALIGNMENT

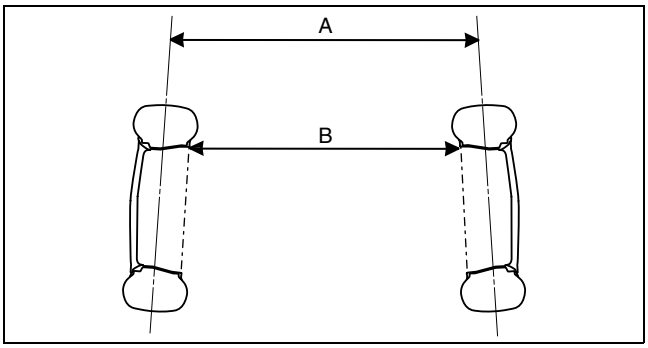
id021100800200

### Front wheel alignment (Unloaded)*1

| Item | | | Fuel gauge indication | | | | |
|---|---|---|---|---|---|---|---|
| | | | Empty | 1/4 | 1/2 | 3/4 | Full |
| Maximum steering angle [Tolerance ±3°] | | Inner | 36°06′ | | | | |
| | | Outer | 30°54′ | | | | |
| Total toe-in | [Tolerance ±2 {±0.08}] | (mm {in}) | 0 {0.00} | | | | |
| | | (degree) | 0°00′±0°09′ | | | | |
| Caster angle*2 [Tolerance ±1°] | | | 3°02′ | 3°05′ | 3°08′ | 3°10′ | 3°12′ |
| Camber angle*2 [Tolerance ±1°] | | | –0°19′ | | | –0°20′ | |
| Steering axis inclination (Reference value) | | | 11°42′ | | 11°43′ | | 11°44′ |

*1 : Engine coolant and engine oil are at specified level. Spare tire, jack and tools are in designated position.
*2 : Difference between left and right must not exceed **1°30′.**

**Note**
**Total toe-in measuring position**
- Tire: A indicated in the figure (between the center of the tires)
- Rim inner: B indicated in the figure (between the inner side of the rims)



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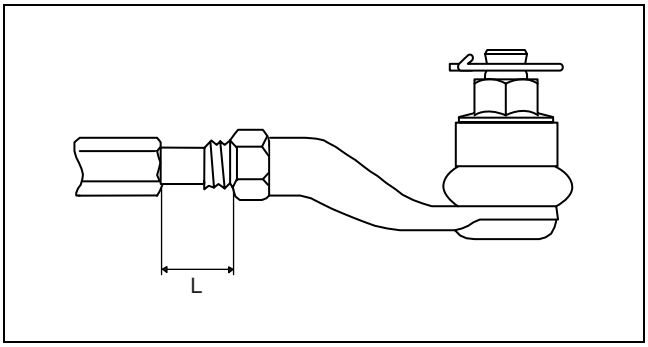
**Steering Angle Adjustment**
1. Jack up the front of the vehicle and support it on safety stands.
2. Loosen the locknut of the tie-rod end.
3. Remove the rack boot clamp.
4. Rotate the tie rod and adjust the steering angle.

**Note**
- The travel distance of the right and left tie rods should be the same.

5. Rotate the tie rod and adjust so that the length L shown in the figure is within the specification.

**Dimension L (reference value)**
**9.5— 23.5 mm {0.38— 0.92 in}**

**Difference between left and right**
**3 mm {0.12 in} or less**



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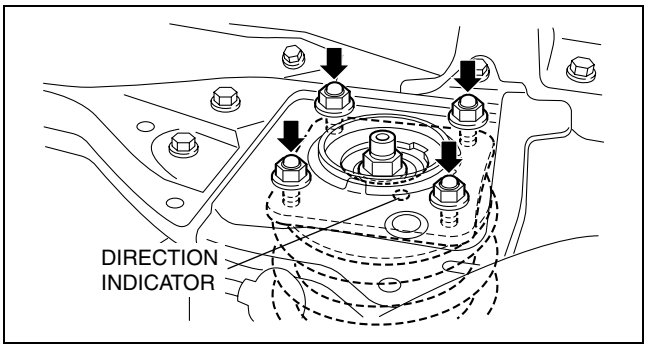
6. Tighten the locknut of the tie-rod end.

**Tightening torque**
**68.6— 98.0 N·m {7.00— 9.99 kgf·m, 50.6— 72.2 ft·lbf}**

7. Correct the rack boot twists.
8. Install and fix the rack boot clamp.
9. After adjusting the steering angle, always inspect and adjust the toe angle.

**Camber and Caster Adjustment**

1. Remove the windshield wiper arm. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
3. Jack up the front of the vehicle and support it on safety stands.
4. Remove the mounting rubber nuts.

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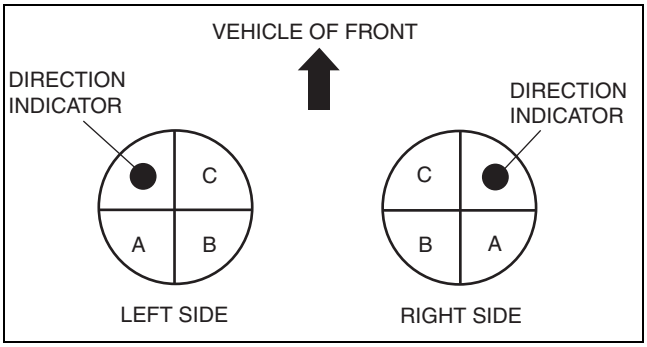
5. Push the shock absorber and coil spring component downward, and turn the direction indicator to the desired position.

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**Adjustment value from original position**

| Direction indicator position | Camber angle | Caster angle |
|---|---|---|
| A | 0° | -0°22′ |
| B | +0°22′ | -0°22′ |
| C | +0°22′ | 0° |

6. Install the shock absorber and coil spring, then tighten the mounting rubber nuts to the specified torque.

**Tightening torque**
**46.1— 62.7 N·m {4.71— 6.39 kgf·m, 34.1— 46.2 ft·lbf}**

7. Install the cowl grille. (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
8. Install the windshield wiper arm. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)

**Total Toe-in Adjustment**

1. Jack up the front of the vehicle and support it on safety stands.
2. Loosen the locknut of the tie-rod end.
3. Remove the rack boot clamp.
4. Adjust the total toe-in by rotating each tie rod (left and right) in the opposite directions by the same amount respectively.

**Note**
- Toe angle changes by **approx. 6 mm {0.2 in} per one rotation** of the tie rod for one wheel.
- Each tie rod has a right-hand thread. When increasing the toe-in angle, rotate the right tie rod toward the front of the vehicle and rotate the left tie rod toward the rear of the vehicle by the same amount.

5. Tighten the locknut of the tie-rod end.

**Tightening torque**
**68.6— 98.0 N·m {7.00— 9.99 kgf·m, 50.6— 72.2 ft·lbf}**

6. Verify that the rack boot does not have any twisting and install the rack boot clamp.

## REAR WHEEL ALIGNMENT

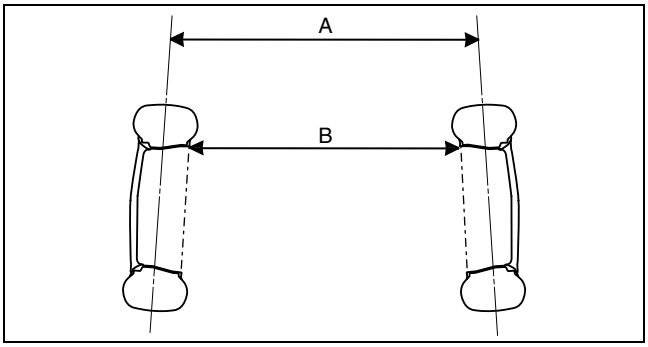
id021100800300

### Rear wheel alignment (Unloaded)*1

| Item | | | Fuel gauge indication | | | | |
|---|---|---|---|---|---|---|---|
| | | | Empty | 1/4 | 1/2 | 3/4 | Full |
| Total toe-in | [Tolerance ±4 {±0.16}] | (mm {in}) | 2 {0.08} | | | | |
| | | (degree) | 0°10′±0°20′ | | | | |
| Camber angle*2 (Reference value) [Tolerance ±1°] | | | −0°51′ | −0°54′ | −0°57′ | −1°00′ | −1°03′ |
| Thrust angle (Reference value) [Tolerance ±0°48′] | | | 0° | | | | |

*1 : Engine coolant and engine oil are at specified level. Spare tire, jack and tools are in designated position.
*2 : Difference between left and right must not exceed **1°30′.**

**Note**
**Total toe-in measuring position**
- Tire: A indicated in the figure (between the center of the tires)
- Rim inner: B indicated in the figure (between the inner side of the rims)



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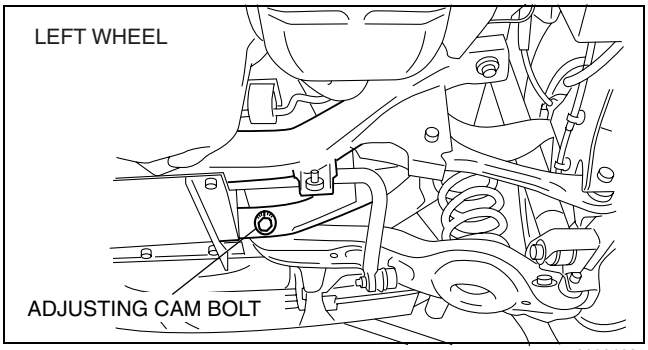
**Total Toe-in Adjustment**
1. Loosen the securing nut of the adjusting cam bolt.
2. Rotate the adjusting cam bolt in either direction to adjust the toe-in.

| | Left wheel | Right wheel |
|---|---|---|
| Toe-out direction | Counterclockwise | Clockwise |
| Toe-in direction | Clockwise | Counterclockwise |

3. Tighten the nut.

**Tightening torque**
**80— 100 N·m {8.2— 10.1 kgf·m, 59.1— 73.7 ft·lbf}**



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# 02-12 WHEEL AND TIRES

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## WHEEL AND TIRE SPECIFICATION

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### Wheel and tire

| Item | | | Specification | |
|---|---|---|---|---|
| **Standard tire and wheel** | | | | |
| Wheel | Size | | 18 × 7 1/2J | |
| | Offset (mm {in}) | | 50 {1.97} | |
| | Pitch circle diameter (mm {in}) | | 114.3 {4.50} | |
| | Material | | Aluminum alloy | |
| Tire | Size | | P235/60R18 102H | 235/60R18 103H (Mexico spec.) |
| | Air pressure (kPa {kgf/cm$^2$, psi}) | Front | 220 {2.2, 32} | 230 {2.3, 34} (Mexico spec.) |
| | | Rear | 220 {2.2, 32} | 230 {2.3, 34} (Mexico spec.) |
| | Remaining tread (mm {in}) | | 1.6 {0.06} | |
| Wheel and tire | Wheel and tire runout (mm {in}) | Radial direction | 1.5 {0.06} max. | |
| | | Lateral direction | 2.0 {0.08} max. | |
| | Wheel imbalance (g {oz}) | | Adhesive-type*1: 10 {0.35} max.<br>Knock-type*2: 6 {0.21} max. | |
| | Tightening torque (N·m {kgf·m, ft·lbf}) | | 88.2—117.6 {9.00—11.99, 65.06—86.73} | |
| **Temporary spare tire** | | | | |
| Wheel | Size | | 18 × 4T | 16 × 5J |
| | Offset (mm {in}) | | 40 {1.57} | 45 {1.77} |
| | Pitch circle diameter (mm {in}) | | 114.3 {4.50} | |
| | Material | | Steel | |
| Tire | Size | | T155/90D18 103M | 205/80R16 100M |
| | Air pressure (kPa {kgf/cm$^2$, psi}) | | 420 {4.2, 60} | 250 {2.5, 36} |
| Wheel and tire | Wheel and tire runout (mm {in}) | Radial direction | 2.0 {0.08} max. | |
| | | Lateral direction | 2.5 {0.10} max. | |

*1 : Total weight exceeds **160 g {5.65 oz}**.
*2 : One balance weight: **60 g {2.12 oz} max.** If the total weight exceeds **100 g {3.53 oz}** on one side, rebalance after moving the tire around on the rim. Do not use three or more balance weights.

## WHEEL BALANCE ADJUSTMENT

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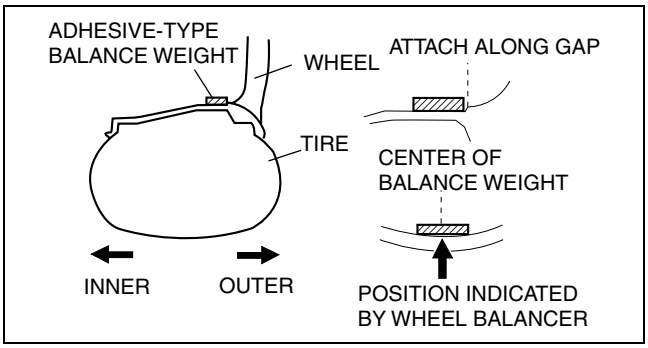
**Caution**
- **Adjust the outer wheel balance first, then the inner wheel balance.**
- **Be careful not to scratch the wheels.**

**Adhesive-type Balance Weight (Outer)**

1. Remove the old balance weight from the wheel.
2. Remove the double-sided adhesive tape remaining on the wheel, then clean and degrease the bonding area.
3. Set the wheel on a wheel balancer, measure the amount of unbalance and the position with the mode set for knock-type balance weight.
4. Multiply the amount of unbalance by **1.6** to obtain the balance weight value.
5. Select a balance weight closest to the weight value and attach the balance weight on the position (outer) indicated by the wheel balancer.

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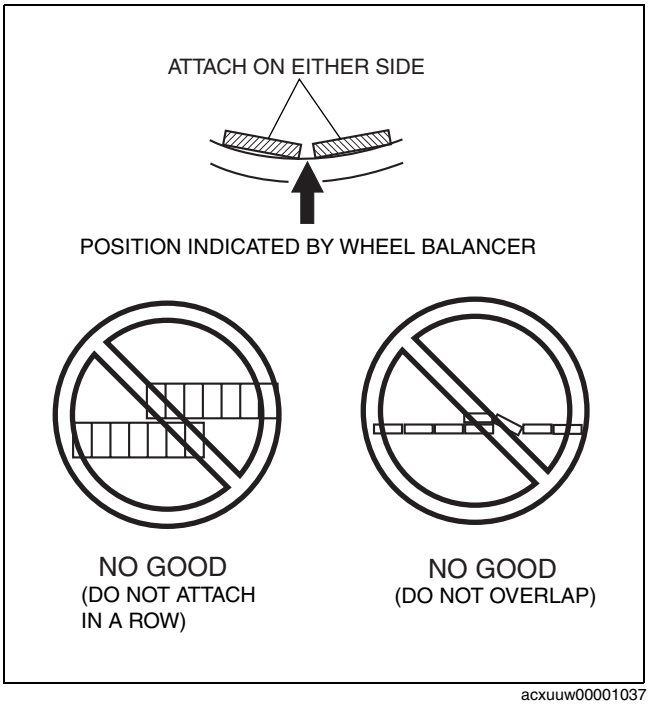
**Example calculation of balance weight value**
**Indicated amount of unbalance: 23 g {0.81 oz}**
**23 g {0.81 oz}×1.6 = 36.8 g {1.30 oz}**
**Selected balance weight value: 35 g {1.24 oz}**

**Note**
- When selecting a balance weight, select one closest to the calculated value.
  Example: **32.4 g {1.14 oz} = 30 g {1.06 oz}**

**Caution**
- **Use a genuine balance weight or equivalent (steel).**
- **When attaching the weight, press the weight with a force of 25 N {2.5 kgf, 5.5 lbf} per 5 g for 2 s or more.**

6. If attaching tow balance weights, position them so that each is on either side of the position indicated by the wheel balancer.

**Caution**
- **Do not attach weight balances in a row.**
- **Do not overlap the balance weights.**
- **Total weight must not exceed 160 g {5.65 oz}.**

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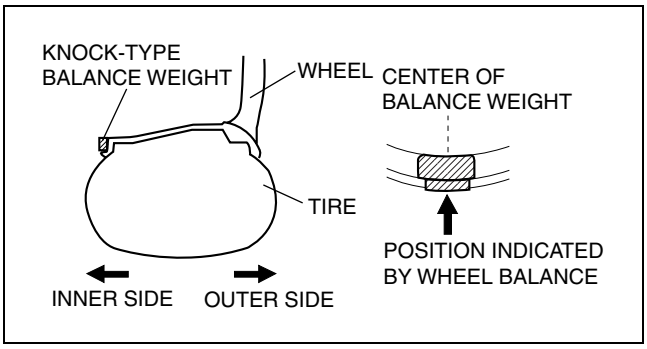
**Knock-type Balance Weight (Inner)**

1. Measure the amount of unbalance with a wheel balancer.
2. Attach a weight corresponding to the measured weight value on the position (inner) indicated by the wheel balancer.

**Caution**

- **Do not attach three or more balance weights.**
- **One balance weight must not exceed 60 g {2.12 oz}, and a total of tow balance weights must not exceed 100 g {3.53 oz}.**

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**Remaining Amount of Unbalance Confirmation**

1. After installing the outer and inner balance weights, operate the wheel balancer again.
2. Confirm that the remaining unbalance does not exceed the following on either side.
   - If the remaining unbalance exceeds the specifications, adjust the wheel balance again.

**Specifications**
**Outer (Adhesive-type): 10 g {0.35 oz}**
**Inner (Knock-type): 6 g {0.21 oz}**

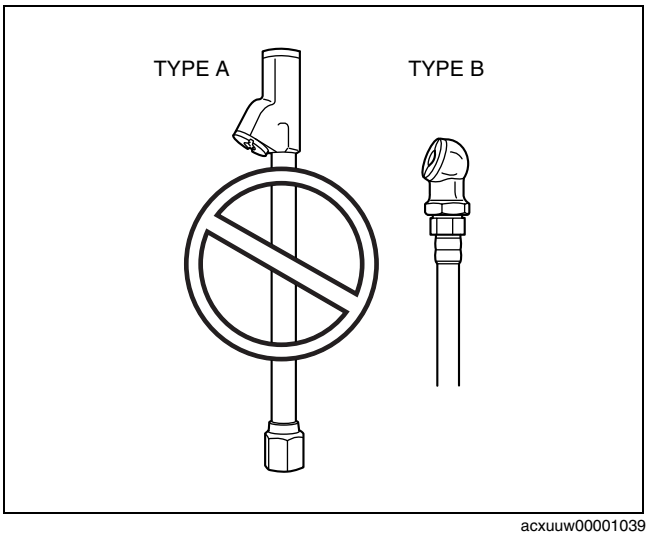
**TIRE PRESSURE ADJUSTMENT (WITH TPMS)**

id021200800300

1. Use of a digital gauge is recommended for accurate measurement of the air pressure.
2. Tire pressure lowers gradually as time passes. Due to this, monthly air pressure inspection is recommended.
3. Perform tire pressure adjustment before driving. (When tires are cold.)
   - Tire pressure will increase after driving because the internal temperature of the tire is high. If tire pressure is adjusted to specifications when the internal temperature of the tire is high, tire pressure will decrease when the internal temperature of the tire decreases to the same level as ambient temperature. If the tire pressure is lower than the lower-limit pressure, the TPMS warning light may illuminate.
   - Even though the air pressure is adjusted to specifications, the indicated air pressure may be higher than the specified value when the internal temperature of the tire is higher than ambient temperature. (Example: Air pressure changes approx. **10 kPa {0.1 kgf/cm$^2$, 1.5 psi}** when the temperature changes **10 °C {18 °F}**)

**Caution**

- **In an area or a season with varying temperatures, tire pressure will change due to ambient temperature change. If the tire pressure is lower than the lower-limit pressure due to low ambient temperature, the TPMS warning light may illuminate. Adjust the pressure when the TPMS warning light illuminates.**
- **Do not tilt or use excessive side force when checking air pressure or inflating the tire with air. Which can provide enough leverage to easily bend or break the wheel unit.**
- **To prevent damage to the valve area of the wheel unit or pressure loss during air pressure adjustment, use a type B tool with a round end as shown in the figure, not a type A tool.**

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## WHEEL UNIT ID REGISTRATION

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**Note**
- After the wheel unit replacement, registration of the wheel unit identification codes must be performed.
- ID registration can be done using the M-MDS, or not using the M-MDS.

**Using M-MDS**

1. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - This function is available for only the IDS (notebook PC).
     1. Select the “Body” tab.
     2. Select the “TPMS Functions”.
     3. Select the “Wheel Unit ID Registration”.
2. Leave the vehicle with the engine off for **15 min or more**.
3. Verify that the TPMS warning light turns on and off in **0.5 s** cycles repeatedly.
4. Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min** to implement the wheel unit ID registration.

   **Note**
   - If the ID registration is not completed even after driving the vehicle for **10 min** or more at a speed of **25 km/h {15.5 mph} or more**, the TPMS warning light flashes.

5. Verify that the TPMS warning light turns off.

   **Note**
   - If the wheel unit ID registration cannot be performed after driving **10 min** or more, refer to the symptom troubleshooting procedure.

**Without Using M-MDS**

1. Turn the ignition switch to the ON position, then turn it off.
2. Leave the vehicle with the engine off for **15 min or more**.
3. Drive the vehicle at a speed of **25 km/h {15.5 mph} or more** for **10 min or more**.
4. After driving for **10 min**, verify that the TPMS warning light does not flash and is not illuminated.

## WHEEL UNIT REMOVAL/INSTALLATION

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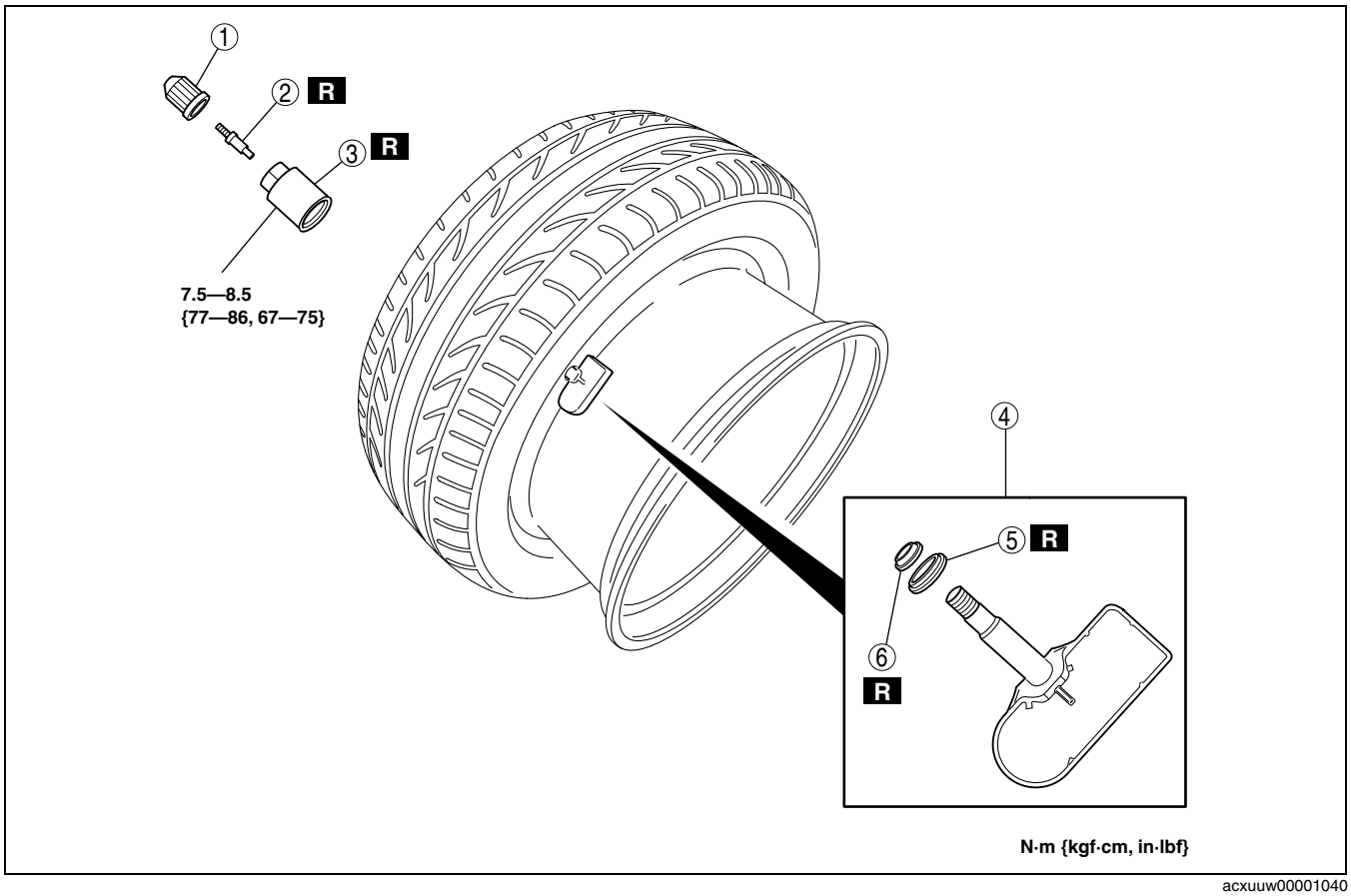
1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. When replacing wheel unit (s), register the new wheel unit ID (s). (See 02-12-4 WHEEL UNIT ID REGISTRATION.)

   **Note**
   - If the wheel unit is replaced with a new one, the ID registration must be performed. When the ID registration is finished, the data for the new wheel unit is displayed on the M-MDS.

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| | |
|---|---|
| 1 | Valve cap |
| 2 | Valve core<br>(See 02-12-5 Valve Core Removal Note.) |
| 3 | Valve nut and washer |

| | |
|---|---|
| 4 | Wheel unit<br>(See 02-12-5 Wheel Unit Removal Note.)<br>(See 02-12-6 Wheel Unit Installation Note.) |
| 5 | Seal washer |
| 6 | Seal |

**Valve Core Removal Note**

1. Remove the valve core of the wheel unit, and bleed the air from the tire.

**Wheel Unit Removal Note**

1. Push the tire valve completely into the tire.

**Caution**

- **Breaking the tire bead with the wheel unit installed normally could damage the unit. Be sure to always push the wheel unit so that it is completely inside the tire to prevent any damage.**

2. Position the shoe (bead breaker) of the tire changer **10— 20 mm {0.40— 0.78 in}** from the outer edge of the wheel, and break both tire beads.
3. Remove the bead from one side of the wheel.
4. Remove the wheel unit.

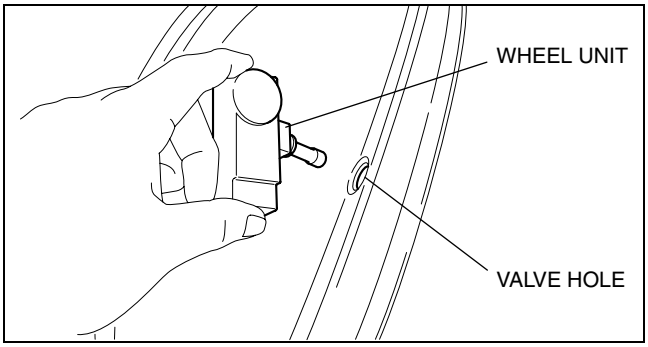
**Wheel Unit Installation Note**

1. Insert the wheel unit valve into the valve hole so that the polyurethane foam side faces the rim.

   **Note**
   - Maintain the wheel unit in contact with the rim, then start manually to screw the valve nut for a few turns.

2. Install the nut from the outer side of the wheel.
3. Tighten the valve nut slowly **(15 rpm max.)** to **8.0 N·m {82 kgf·cm, 71 in·lbf}** in one rotation.

   **Caution**
   - **Do not retighten the valve nut after the initial operation.**



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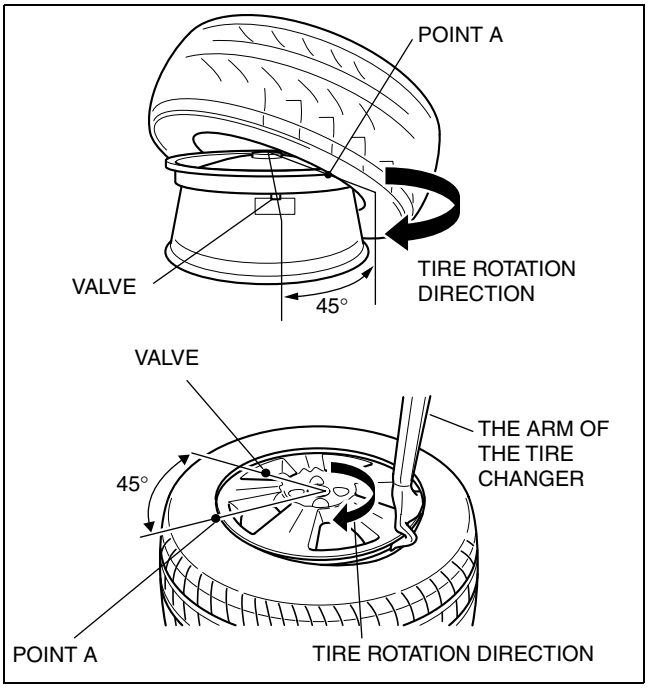
4. Set the tire changer so that it is **45**° away (point A) from the valve hole.

   **Caution**
   - **Do not position the tire changer near the tire valve to avoid any damage to the wheel unit.**



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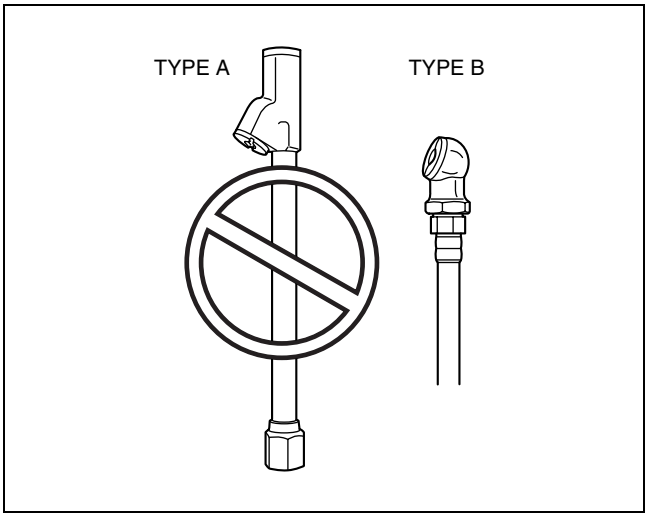
5. Fill the tire with air and verify the valve nut tightening torque.

   **Caution**
   - **To prevent damage to the valve area of the wheel unit or charging loss during air pressure adjustment, use a type B tool with a round end as shown in the figure, not a type A tool.**



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# 02-13 FRONT SUSPENSION

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## FRONT SUSPENSION LOCATION INDEX

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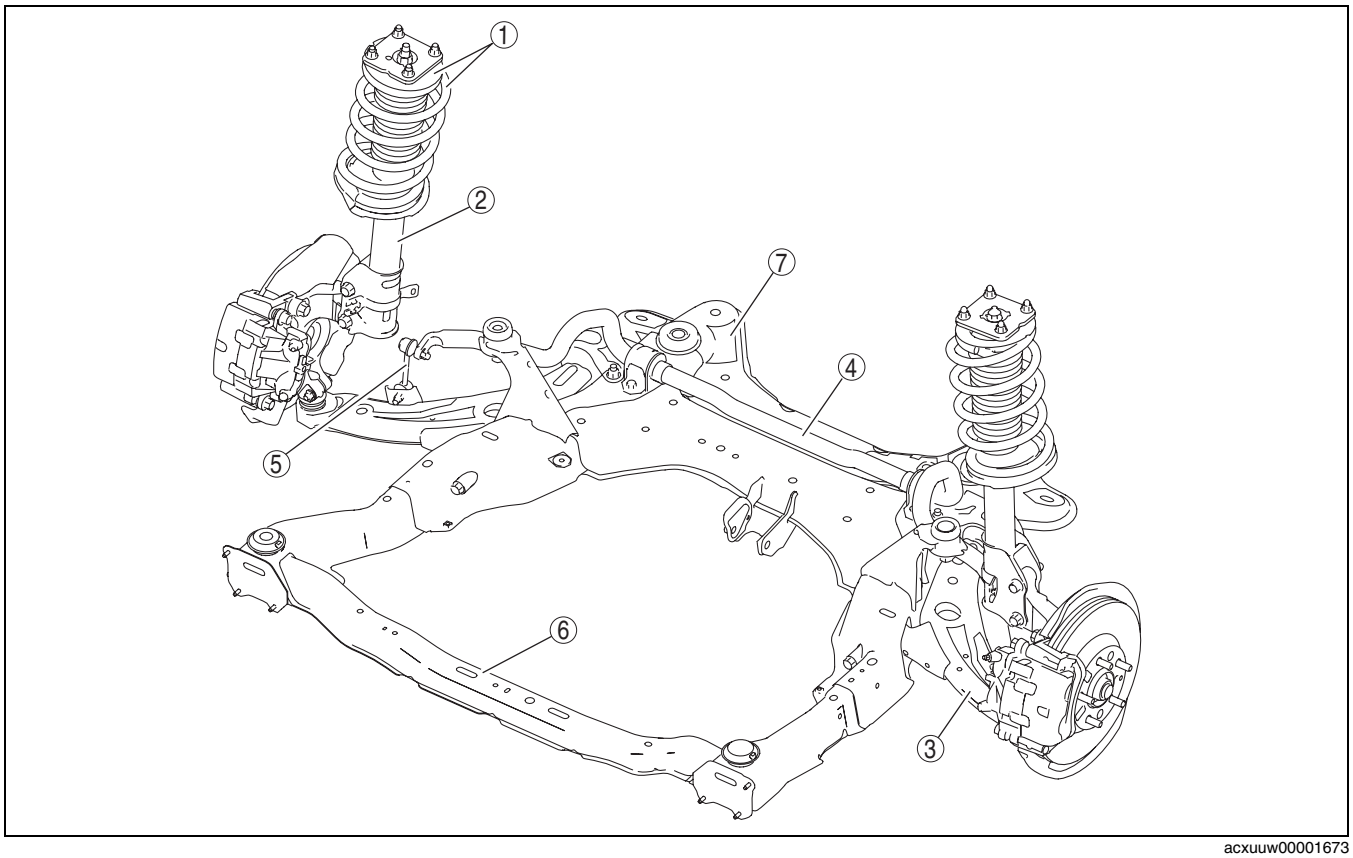


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| | |
|---|---|
| 1 | Front shock absorber and coil spring<br>(See 02-13-3 FRONT SHOCK ABSORBER AND SPRING REMOVAL/INSTALLATION)<br>(See 02-13-4 FRONT SHOCK ABSORBER AND SPRING DISASSEMBLY/ASSEMBLY) |
| 2 | Front shock absorber<br>(See 02-13-6 FRONT SHOCK ABSORBER INSPECTION)<br>(See 02-13-6 FRONT SHOCK ABSORBER DISPOSAL) |
| 3 | Front lower arm<br>(See 02-13-7 FRONT LOWER ARM REMOVAL/INSTALLATION)<br>(See 02-13-7 FRONT LOWER ARM INSPECTION) |
| 4 | Front stabilizer<br>(See 02-13-8 FRONT STABILIZER REMOVAL/INSTALLATION) |
| 5 | Stabilizer control link<br>(See 02-13-9 STABILIZER CONTROL LINK INSPECTION) |
| 6 | Front crossmember<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION) |
| 7 | Transverse member<br>(See 02-13-14 TRANSVERSE MEMBER REMOVAL/INSTALLATION) |

## FRONT SHOCK ABSORBER AND SPRING REMOVAL/INSTALLATION

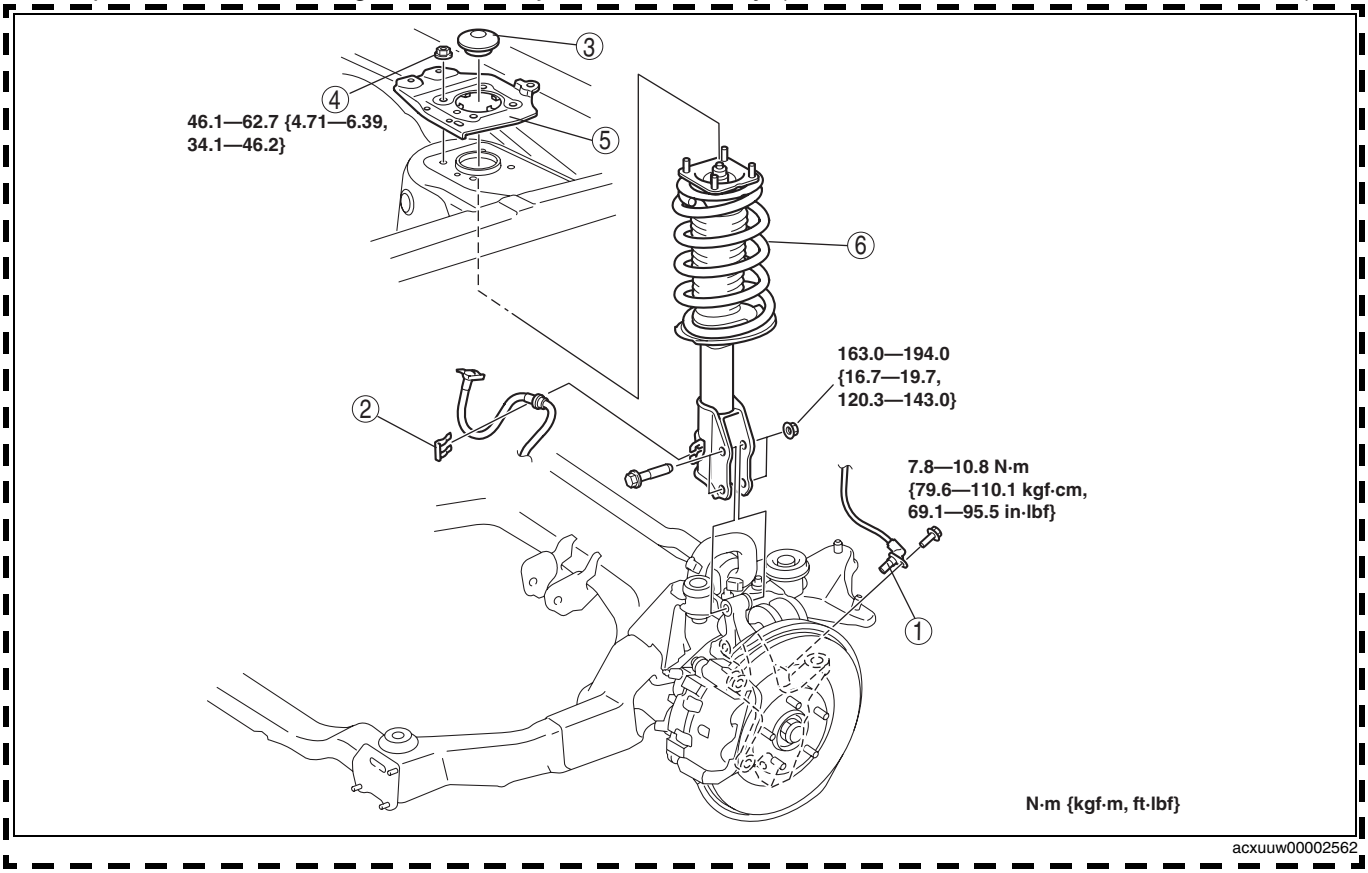
id021300800200

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove the windshield wiper arm. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect for front wheel alignment, and adjust it as necessary. (See 02-11-2 FRONT WHEEL ALIGNMENT.)



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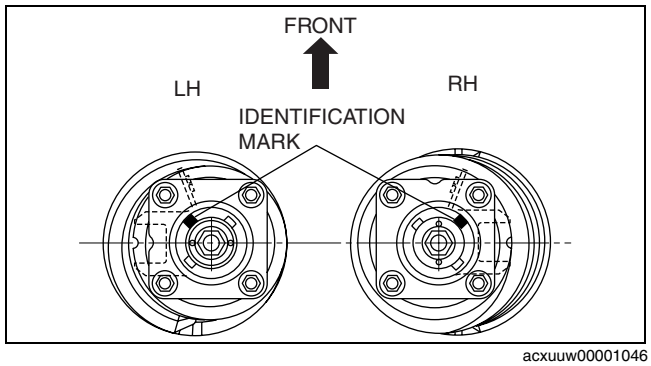
| | |
|---|---|
| 1 | ABS wheel-speed sensor |
| 2 | Clip |
| 3 | Cap (See 02-13-4 Cap Installation Note.) |
| 4 | Nut |
| 5 | Stiffener |
| 6 | Front shock absorber and coil spring (See 02-13-3 Front Shock Absorber and Coil Spring Installation Note) |

### Front Shock Absorber and Coil Spring Installation Note

1. Install the front shock absorber and coil spring so that the identification mark on the mounting rubber is facing to the position indicated in the figure.

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**Cap Installation Note**

**Caution**
- **If the pad in the strut mount area is removed, clean the attachment surface and install the cap. If the cap is not installed, the front shock absorber may corrode due to water penetration and cause a malfunction.**

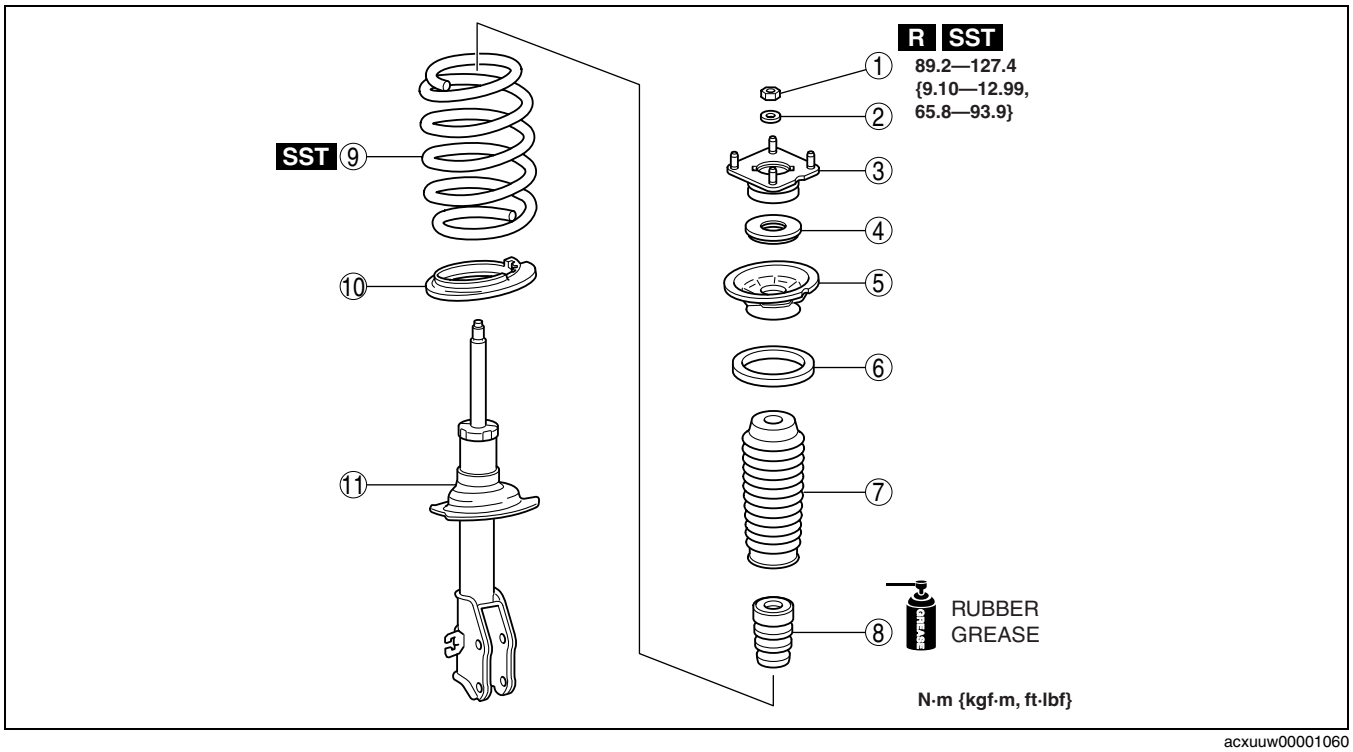
## FRONT SHOCK ABSORBER AND SPRING DISASSEMBLY/ASSEMBLY

id021300800300

1. Remove the front shock absorber and coil spring. (See 02-13-3 FRONT SHOCK ABSORBER AND SPRING REMOVAL/INSTALLATION.)

**Warning**
- **Removing/installing the piston rod nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SSTs before removing the piston rod nut.**

2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassemble.

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| | |
|---|---|
| 1 | Piston rod nut<br>(See 02-13-5 Piston Rod Nut Disassembly Note) |
| 2 | Washer |
| 3 | Mounting rubber<br>(See 02-13-6 Mounting Rubber Assembly Note) |
| 4 | Bearing |
| 5 | Upper spring seat<br>(See 02-13-5 Upper Spring Seat Assembly Note) |

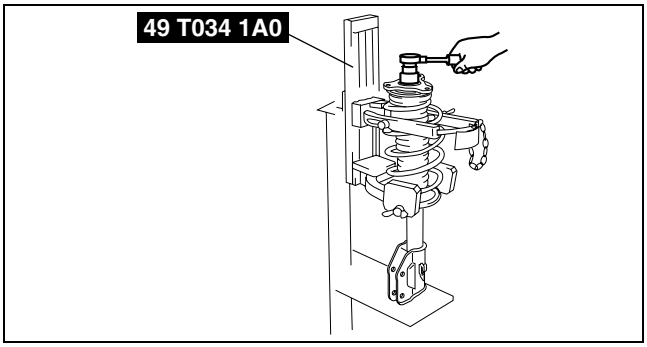
| | |
|---|---|
| 6 | Upper spring seat rubber |
| 7 | Dust boot |
| 8 | Bound stopper |
| 9 | Coil spring<br>(See 02-13-5 Coil Spring Assembly Note) |
| 10 | Lower spring seat |
| 11 | Front shock absorber |

**Piston Rod Nut Disassembly Note**

**Warning**

- **Removing the piston rod nut is dangerous. The shock absorber and spring could fly off under tremendous pressure and cause serious injury or death. Secure the shock absorber in the SSTs before removing the piston rod nut.**

1. Protect the coil spring using a piece of cloth, then set the **SSTs**.
2. Compress the coil spring using the **SSTs**, and remove the piston rod nut.

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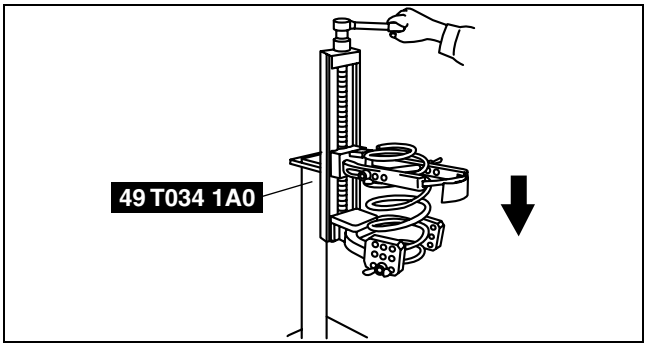
**Coil Spring Assembly Note**

1. Compress the coil spring using the **SST**.
2. Install the shock absorber so that the lower end of the coil spring is seated on the step of the lower spring seat.

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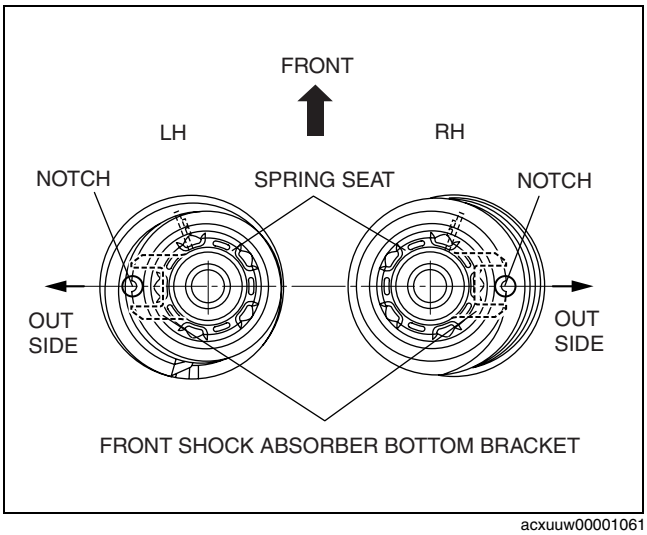
**Upper Spring Seat Assembly Note**

1. Install the upper spring seat so that the notch is facing to the out side of the vehicle.

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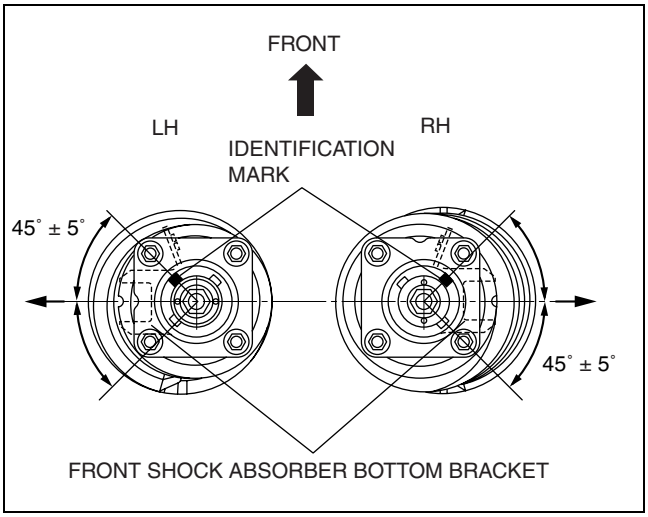
**Mounting Rubber Assembly Note**

1. Slide the mounting rubber identification mark away from the notch of the spring seat and install.

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**FRONT SHOCK ABSORBER INSPECTION**

id021300800800

1. Remove the front shock absorber. (See 02-13-3 FRONT SHOCK ABSORBER AND SPRING REMOVAL/INSTALLATION.) (See 02-13-4 FRONT SHOCK ABSORBER AND SPRING DISASSEMBLY/ASSEMBLY.)
2. Inspect for damage and oil leakage.
3. Inspect the rubber bushing for deterioration and wear.
4. Compress and extend the shock piston at least three times. Verify that the operational force does not change and that there is no unusual noise.
   - If not as specified, replace the shock absorber.
   (1) Compress the shock absorber piston and release it.
   (2) Verify that the piston extends fully at a normal speed.

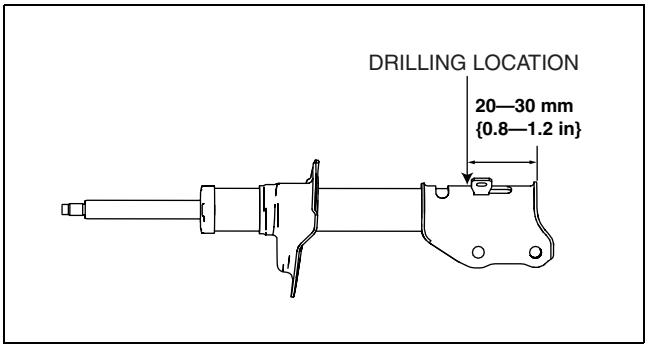
**FRONT SHOCK ABSORBER DISPOSAL**

id021300800900

**Warning**

- **Whenever drilling into a shock absorber, wear protective eye wear. The gas in the shock absorber is pressurized, and could spray metal chips into the eyes and face when drilling.**

1. Clamp a shock absorber on a flat surface or with the piston pointing downwards.
2. Drill a **2— 3 mm {0.08— 0.12 in}** hole at a point **20— 30 mm {0.8— 1.2 in}** from the bottom of the tube, so that the gas can escape.
3. Turn the hole downwards.
4. The oil can be collected by moving the piston rod several times up and down and cutting the tube at the end.
5. Dispose of waste oil according to the waste disposal law.

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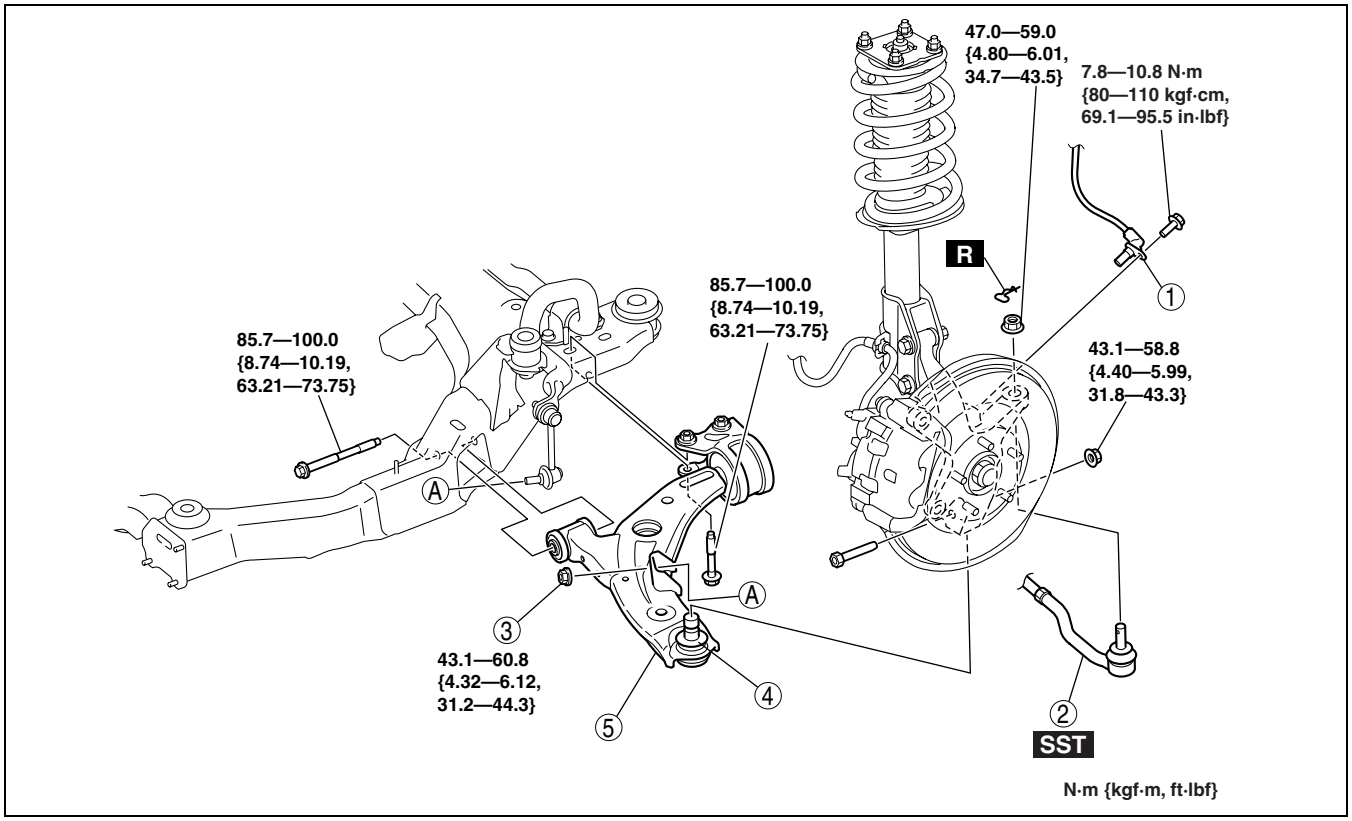
**Note**

- Shock absorber gas is nitrogen gas.
- Shock absorber oil is mineral oil.

## FRONT LOWER ARM REMOVAL/INSTALLATION

id021300800600

1. Remove the under cover.
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.

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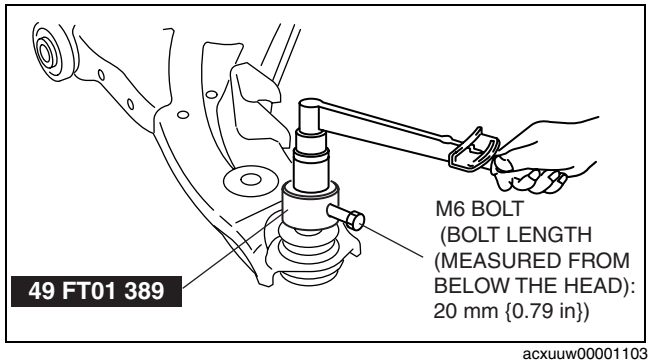
| | |
|---|---|
| 1 | ABS wheel speed sensor |
| 2 | Tie-rod end ball joint (See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.) |
| 3 | Stabilizer control link lower nut |
| 4 | Front lower arm ball joint |
| 5 | Front lower arm |

## FRONT LOWER ARM INSPECTION

id021300800700

1. Remove the lower arm from the vehicle.
2. Inspect the arm for bending or damage, and the ball joint for excessive looseness.
   - If there is any malfunction, replace the lower arm.
3. Rotate the ball joint stud **5 times**. Install the **SST** and M6 bolt (bolt length (measured from below the head): 20 mm {0.79 in}) to the ball joint stud, measure the rotational torque using a torque wrench.
   - If not within the specification, replace the lower arm.

   **Front lower arm rotational torque**
   **1.4— 2.0 N·m {15— 20 kgf·cm, 13— 17 in·lbf}**

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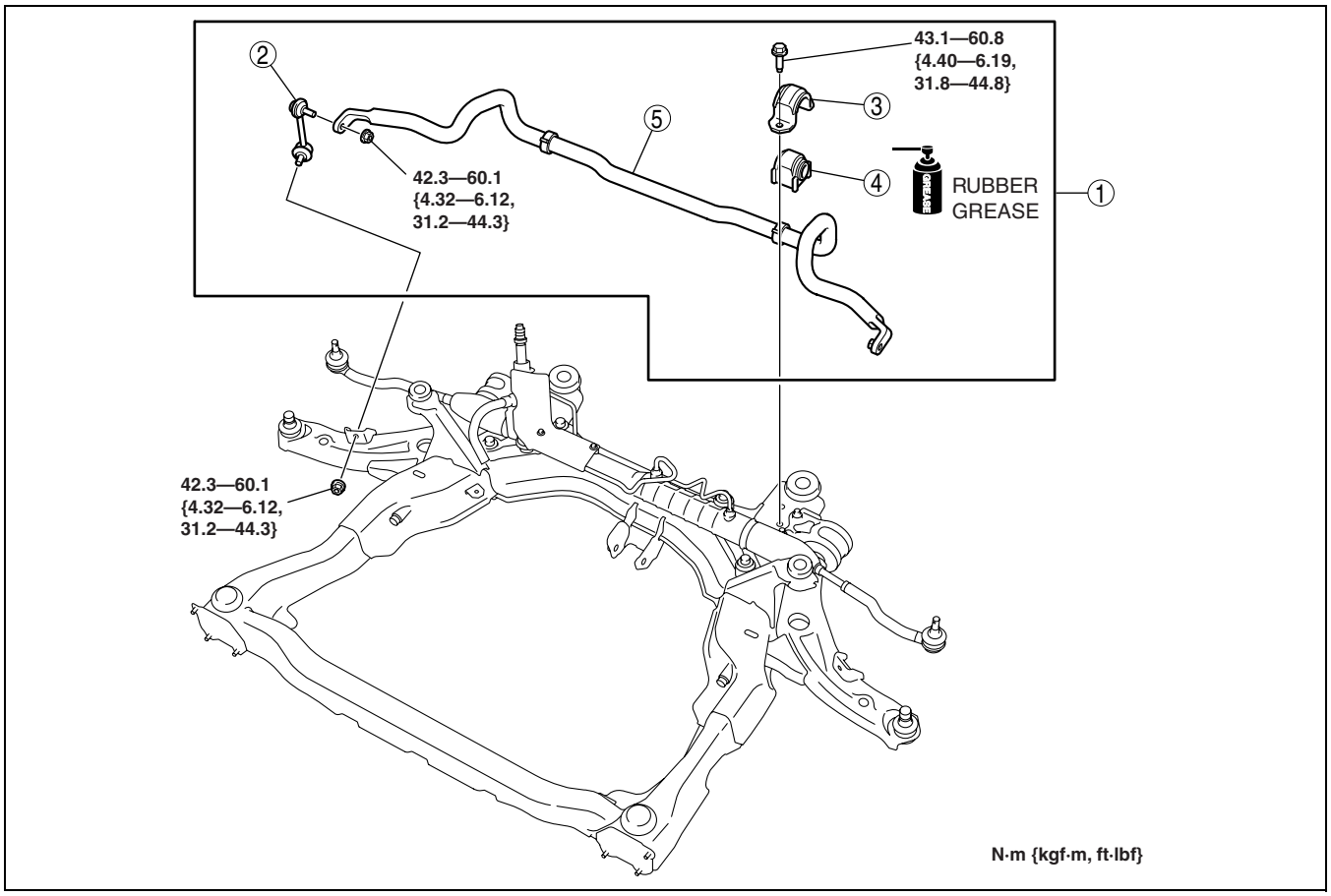
## FRONT STABILIZER REMOVAL/INSTALLATION

id021300800400

1. Remove the side cover and under cover.
2. Drain the power steering fluid. (See 06-14-3 POWER STEERING FLUID INSPECTION.)
3. Remove the transverse member. (See 02-13-14 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
4. Remove the front crossmember component. (See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.

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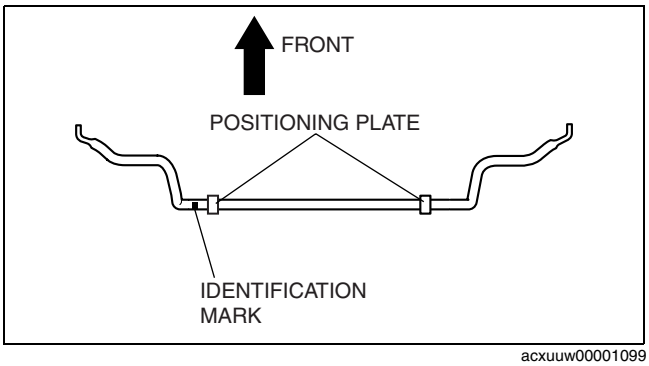
| | |
|---|---|
| 1 | Front stabilizer component |
| 2 | Front stabilizer control link |
| 3 | Stabilizer bracket<br>(See 02-13-9 Stabilizer Bracket Installation Note) |
| 4 | Stabilizer bushing<br>(See 02-13-9 Stabilizer Bushing Installation Note) |
| 5 | Front stabilizer<br>(See 02-13-8 Front Stabilizer Installation Note) |

### Front Stabilizer Installation Note

1. Install the stabilizer bar so that the identification mark is on the left side of the vehicle.

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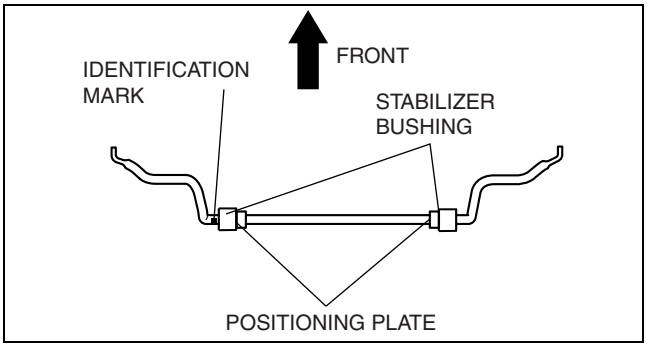
**Stabilizer Bushing Installation Note**

1. Align the outer side of the positioning plate with the stabilizer bushing.

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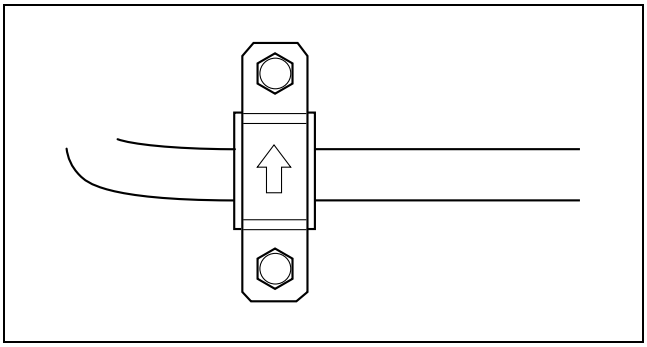
**Stabilizer Bracket Installation Note**

1. Install the stabilizer bracket so that the arrow is pointed to the front.



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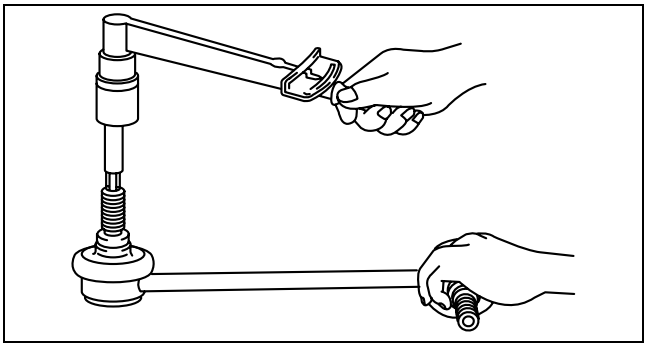
**STABILIZER CONTROL LINK INSPECTION**

id021300800500

1. Remove the stabilizer control link from the vehicle. (See 02-13-8 FRONT STABILIZER REMOVAL/ INSTALLATION.)
2. Inspect for bending and damage.
3. Measure the ball joint starting torque.
   (1) Rock the ball joint stud side to side 10 times.
   (2) Rotate the ball joint stud 10 times.
   (3) Measure the starting torque using a suitable allen socket and a torque wrench.

   **Front stabilizer control link ball joint starting torque**
   **0.2— 0.9 N·m {2.1— 9.1 kgf·cm, 1.8— 7.9 in·lbf}**



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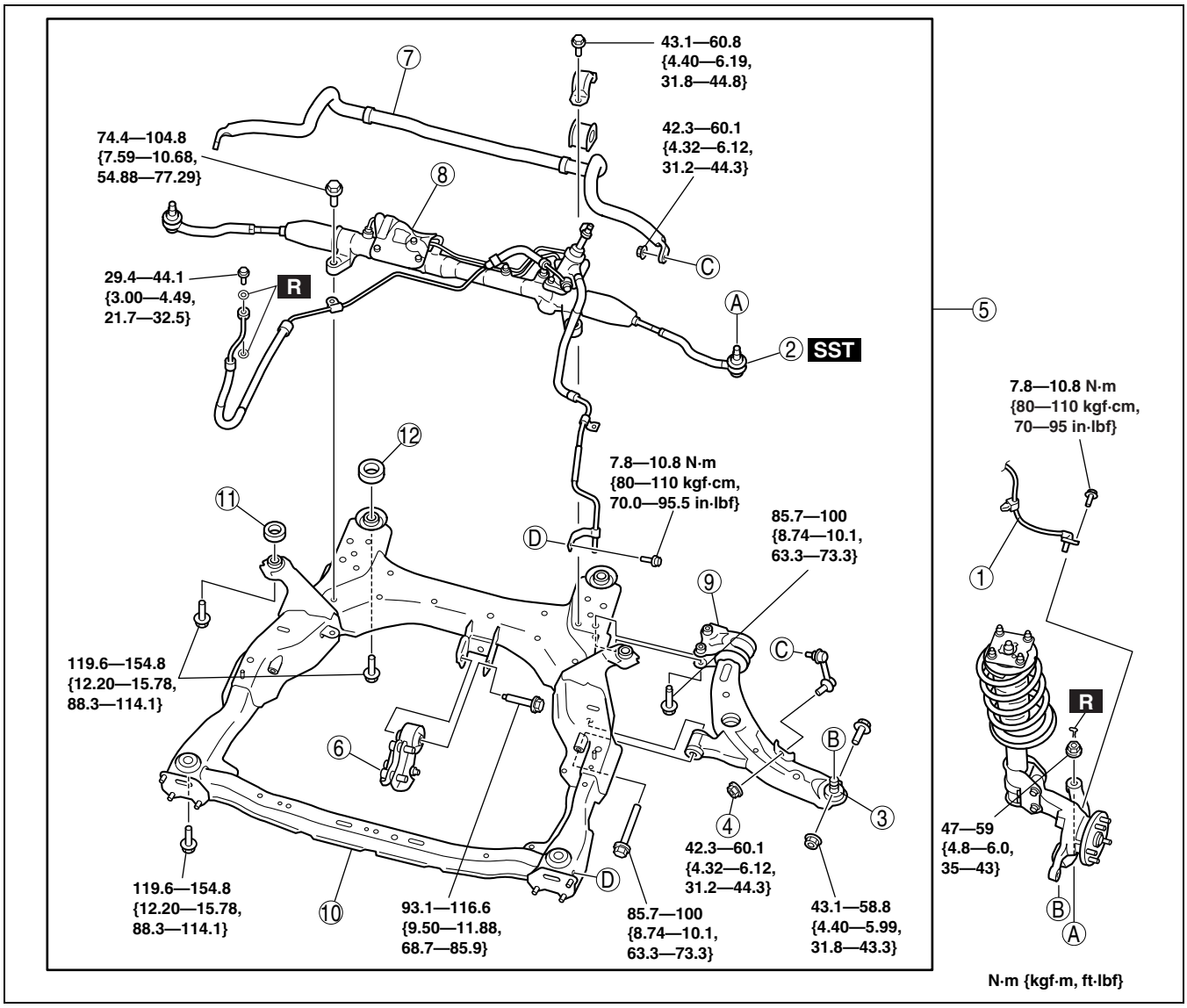
## FRONT CROSSMEMBER REMOVAL/INSTALLATION

id021300801000

1. Remove the side cover and under cover.
2. Drain the power steering fluid. (See 06-14-3 POWER STEERING FLUID INSPECTION.)
3. Remove the transverse member. (See 02-13-14 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
4. Remove the intermediate shaft installation bolt, and disconnect the steering shaft. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. When replace the front crossmember, inspect the front wheel alignment and adjust it if necessary. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

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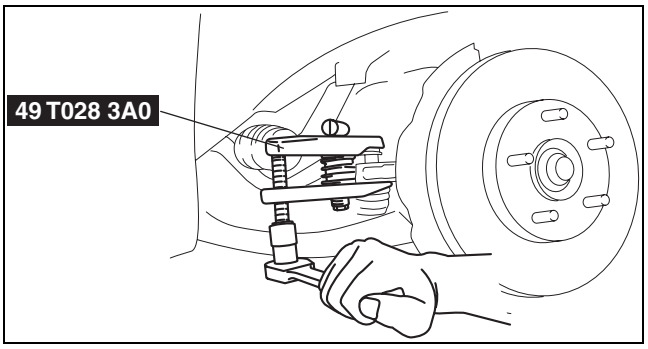
| | |
|---|---|
| 1 | ABS wheel speed sensor |
| 2 | Tie-rod end ball joint<br>(See 02-13-11 Tie-rod End Ball Joint Removal Note) |
| 3 | Front lower arm ball joint |
| 4 | Stabilizer control link lower side nut |
| 5 | Steering gear and linkage, front stabilizer, front lower arm and front crossmember component<br>(See 02-13-11 Steering Gear And Linkage, Front Stabilizer, Front Lower Arm And Front Crossmember Component Removal Note)<br>(See 02-13-13 Steering Gear And Linkage, Front Stabilizer, Front Lower Arm And Front Crossmember Component Installation Note) |

| | |
|---|---|
| 6 | No. 1 engine mount |
| 7 | Front stabilizer |
| 8 | Steering gear and linkage |
| 9 | Front lower arm |
| 10 | Front crossmember |
| 11 | Front crossmember mounting rubber (front)<br>(See 02-13-12 Front Crossmember Mounting Rubber (front) Installation Note) |
| 12 | Front crossmember mounting rubber (rear)<br>(See 02-13-12 Front Crossmember Mounting Rubber (rear) Installation Note) |

**Tie-rod End Ball Joint Removal Note**

1. Remove the tie-rod end ball joint locknut.
2. Disconnect the tie-rod end ball joint using the **SST**.

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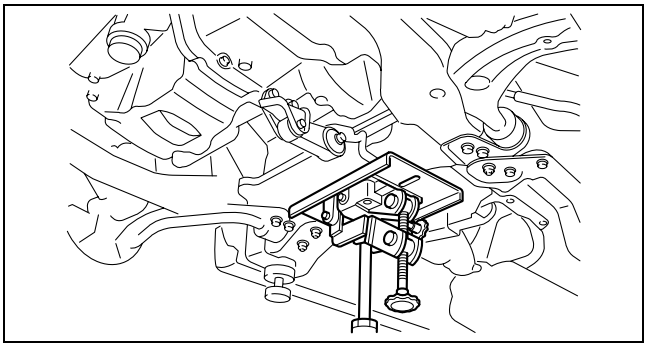
**Steering Gear And Linkage, Front Stabilizer, Front Lower Arm And Front Crossmember Component Removal Note**

1. Support the crossmember component with a jack.



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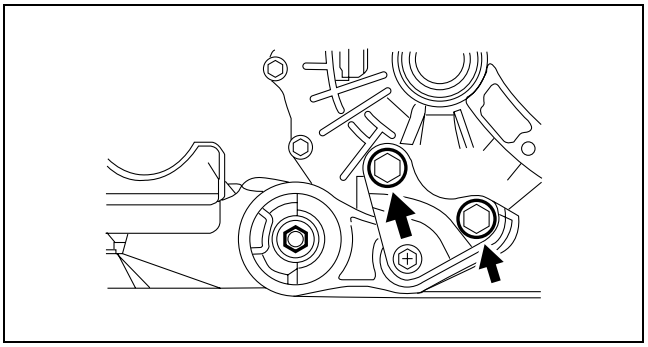
2. Loosen the bolts of the No.1 engine mount (engine side).



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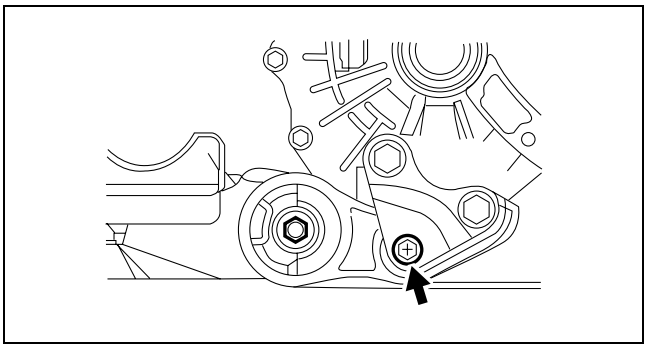
3. Remove the No.1 engine mount bolt (engine side).
4. Lower the steering gear and linkage, front stabilizer, front lower arm and front crossmember component slightly.



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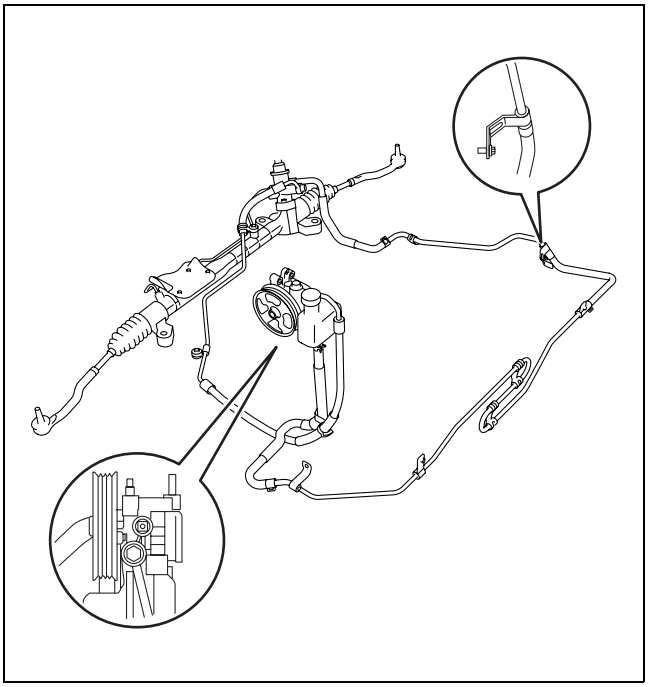
5. Disconnect the return hose indicated in the figure.
6. Disconnect the pressure hose (power steering pump side) indicated in the figure.



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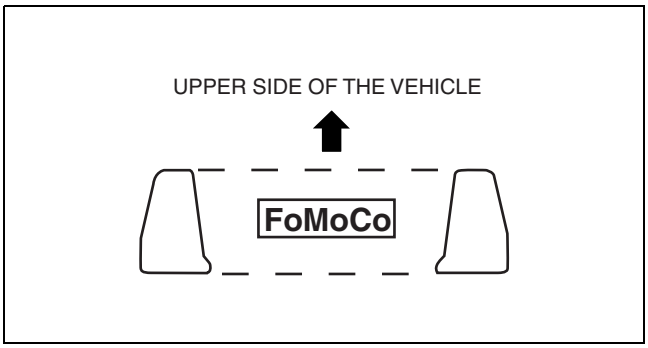
**Front Crossmember Mounting Rubber (front) Installation Note**

1. Install the front crossmember mounting rubber (front) so that the smaller outer diameter is facing upward.

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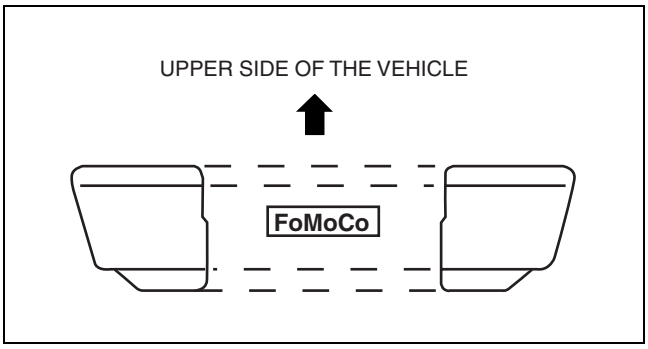
**Front Crossmember Mounting Rubber (rear) Installation Note**

1. Install the front crossmember mounting rubber (rear) so that the larger outer diameter is facing upward.

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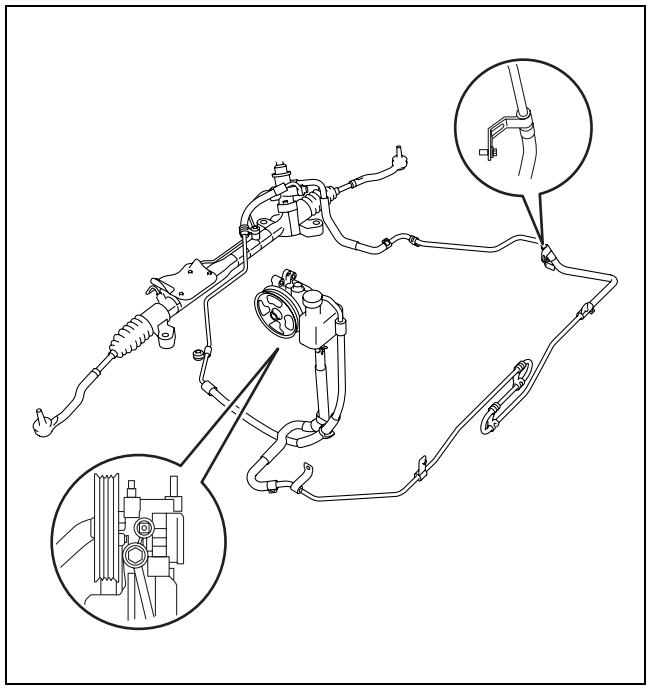
**Steering Gear And Linkage, Front Stabilizer, Front Lower Arm And Front Crossmember Component Installation Note**

1. Raise the steering gear and linkage, front stabilizer, front lower arm and front crossmember component to the appropriately level, and install the return hose and pressure hose.

   **Tightening torque**
   **Return hose: 7.8— 10.8 N·m {80— 110 kgf·cm, 69.1— 95.5 in·lbf}**
   **Pressure hose (power steering pump side): 29.4— 44.1 N·m {3.00— 4.49 kgf·m, 21.7— 32.5 ft·lbf}**



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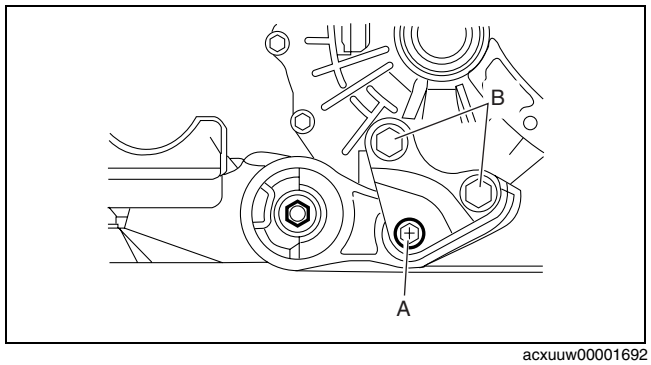
2. Temporarily install the No.1 engine mount bolt A indicated in the figure.
3. Tighten the No.1 engine mount bolts B indicated in the figure.

   **Tightening torque**
   **93.1— 116.6 N·m {9.50— 11.8 kgf·m, 68.7— 85.9 ft·lbf}**

4. Teighten the No.1 engine mount bolt A at the specified torque.

   **Tightening torque**
   **85.3— 116.6 N·m {8.70— 11.8 kgf·m, 63.0— 85.9 ft·lbf}**

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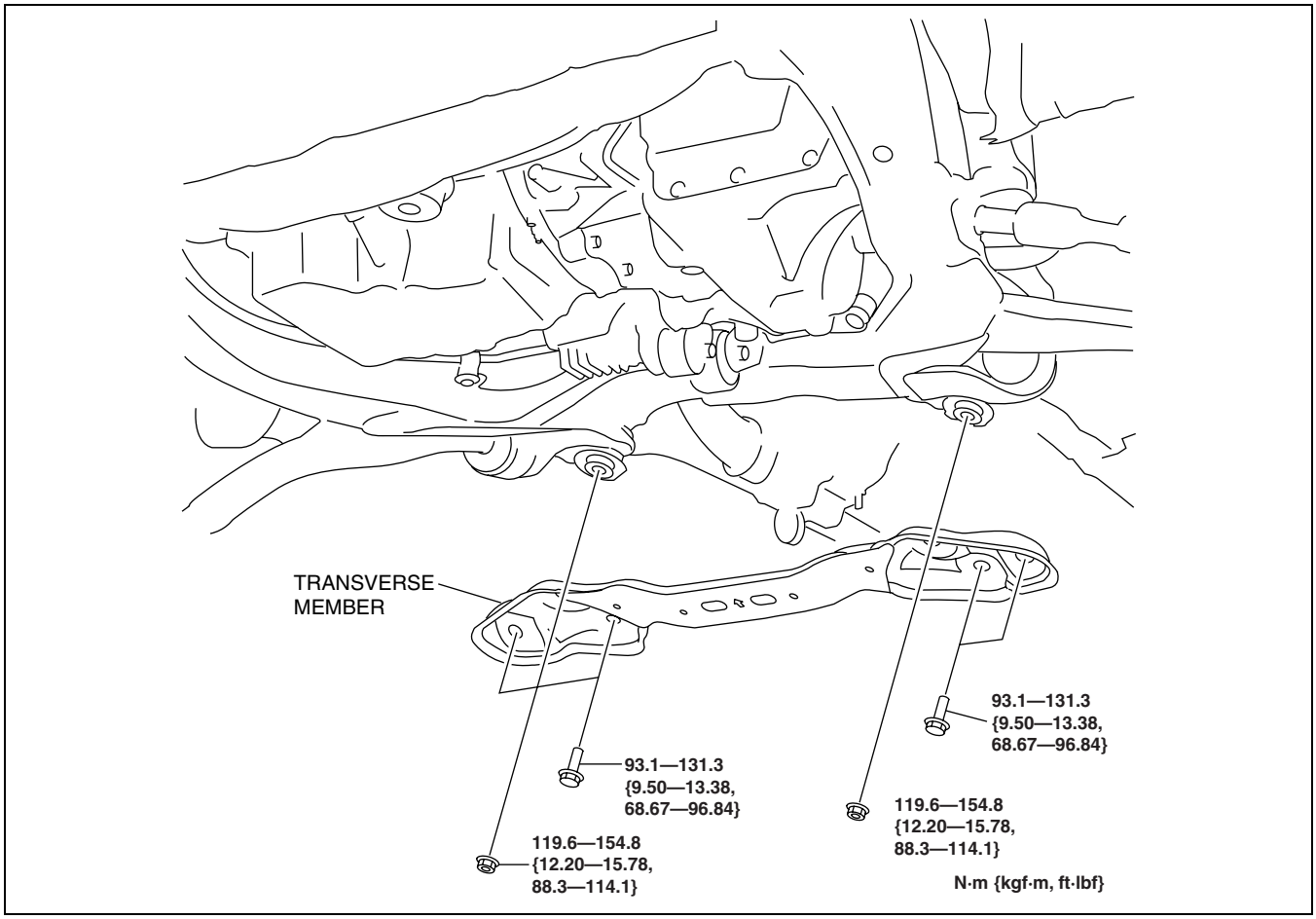
5. Install the steering gear and linkage, front stabilizer, front lower arm and front crossmember component.
6. Tighten the No.1 engine mount bolt (crossmember side).

## TRANSVERSE MEMBER REMOVAL/INSTALLATION

id021300801100

1. Remove the transverse member.

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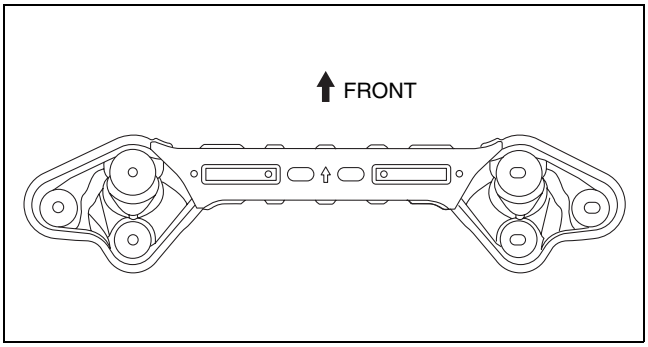
2. Install the transverse member so that the arrow is pointing to the front of the vehicle.

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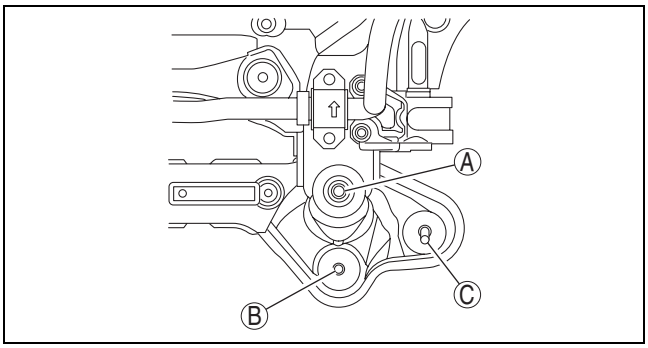
3. Tighten the nut A, then tighten the bolts in the order of B, C to the specified torque.

**Tightening torque**
**Nut A: 119.6— 154.8 N·m {12.20— 15.78 kgf·m, 88.3— 114.1 ft·lbf}**
**Bolts B and C: 93.1— 131.3 N·m {9.50— 13.38 kgf·m, 68.67— 96.84 ft·lbf}**

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# 02-14 REAR SUSPENSION


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## REAR SUSPENSION LOCATION INDEX[2WD]

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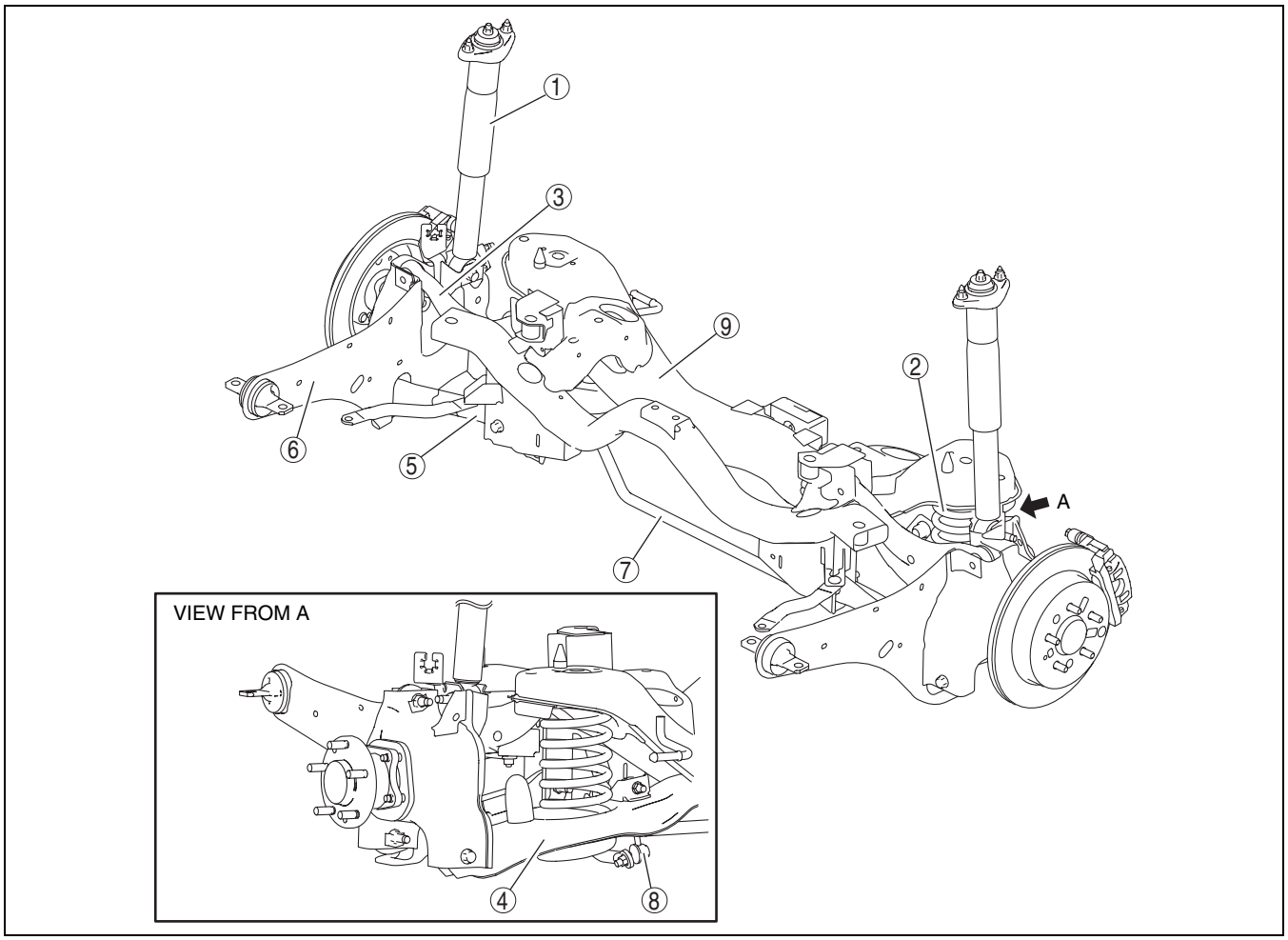


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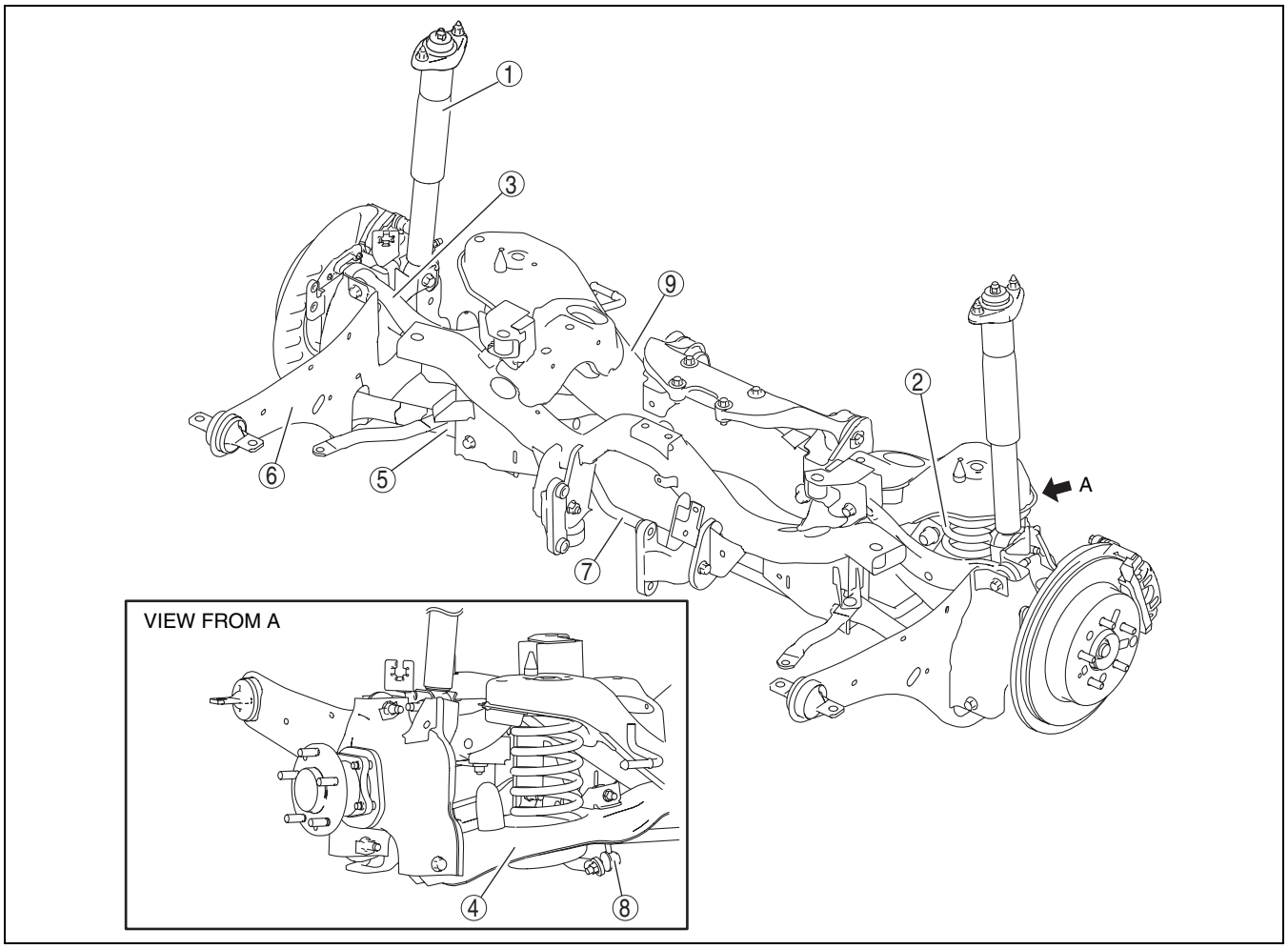
| | |
|---|---|
| 1 | Rear shock absorber<br>(See 02-14-4 REAR SHOCK ABSORBER REMOVAL/INSTALLATION.)<br>(See 02-14-5 REAR SHOCK ABSORBER INSPECTION.)<br>(See 02-14-5 REAR SHOCK ABSORBER DISPOSAL.) |
| 2 | Rear coil spring<br>(See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.) |
| 3 | Rear upper arm<br>(See 02-14-10 REAR UPPER ARM REMOVAL/INSTALLATION.) |
| 4 | Rear lower arm<br>(See 02-14-8 REAR LOWER ARM REMOVAL/INSTALLATION.) |

| | |
|---|---|
| 5 | Rear lateral link<br>(See 02-14-8 REAR LATERAL LINK REMOVAL/INSTALLATION.) |
| 6 | Trailing link<br>(See 02-14-12 TRAILING LINK REMOVAL/INSTALLATION[2WD].) |
| 7 | Rear stabilizer<br>(See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.) |
| 8 | Stabilizer control link<br>(See 02-14-12 STABILIZER CONTROL LINK INSPECTION.) |
| 9 | Rear crossmember<br>(See 02-14-18 REAR CROSSMEMBER REMOVAL/INSTALLATION[2WD].) |

## REAR SUSPENSION LOCATION INDEX[AWD]

id0214008004a3



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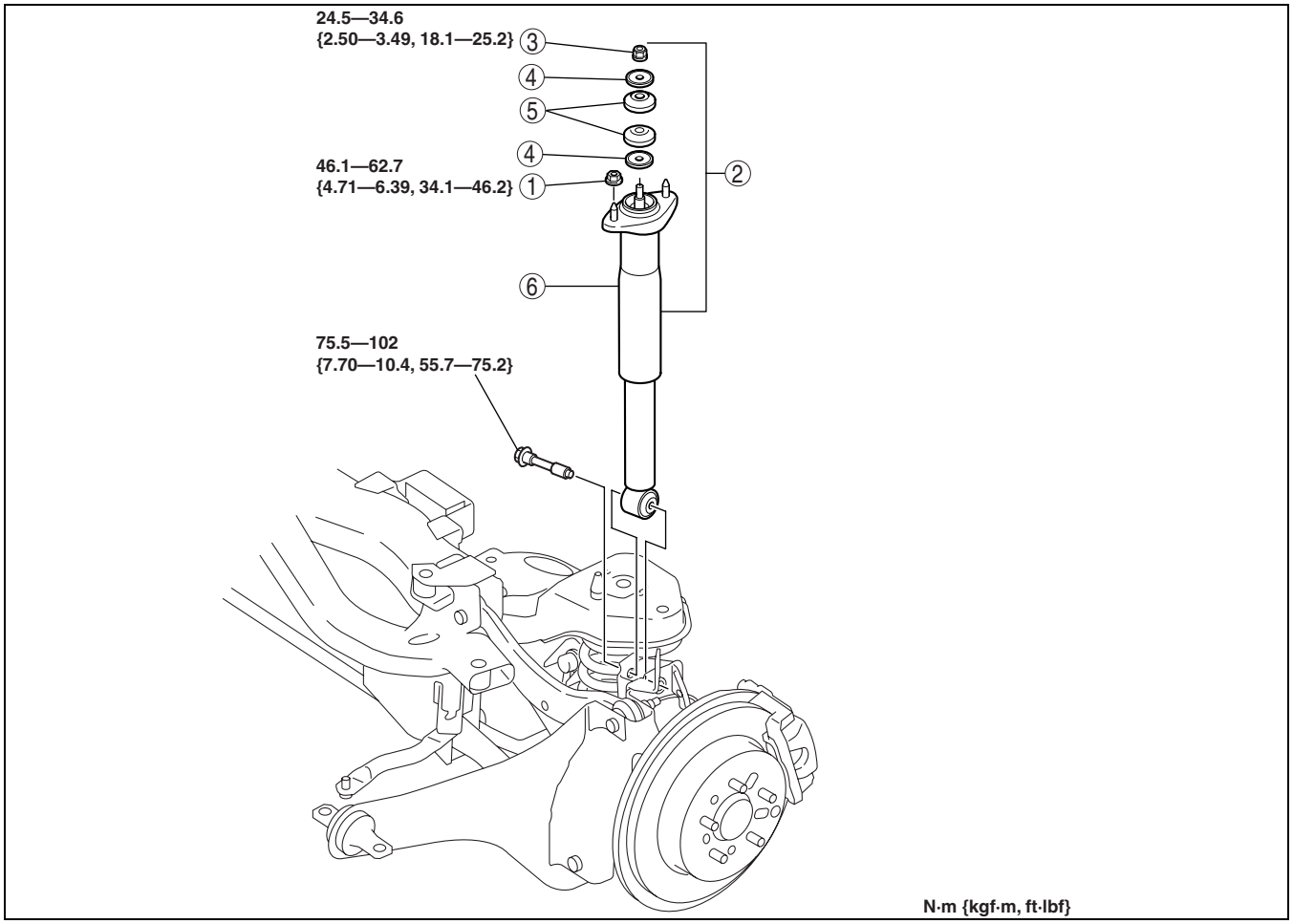
| | |
|---|---|
| 1 | Rear shock absorber<br>(See 02-14-4 REAR SHOCK ABSORBER REMOVAL/INSTALLATION.)<br>(See 02-14-5 REAR SHOCK ABSORBER INSPECTION.)<br>(See 02-14-5 REAR SHOCK ABSORBER DISPOSAL.) |
| 2 | Rear coil spring<br>(See 02-14-6 REAR COIL SPRING REMOVAL/ INSTALLATION.) |
| 3 | Rear upper arm<br>(See 02-14-10 REAR UPPER ARM REMOVAL/ INSTALLATION.) |
| 4 | Rear lower arm<br>(See 02-14-8 REAR LOWER ARM REMOVAL/ INSTALLATION.) |

| | |
|---|---|
| 5 | Rear lateral link<br>(See 02-14-8 REAR LATERAL LINK REMOVAL/ INSTALLATION.) |
| 6 | Rear trailing arm<br>(See 02-14-15 TRAILING LINK REMOVAL/ INSTALLATION[AWD].) |
| 7 | Rear stabilizer<br>(See 02-14-11 REAR STABILIZER REMOVAL/ INSTALLATION.) |
| 8 | Stabilizer control link<br>(See 02-14-12 STABILIZER CONTROL LINK INSPECTION) |
| 9 | Rear crossmember<br>(See 02-14-20 REAR CROSSMEMBER REMOVAL/ INSTALLATION[AWD].) |

## REAR SHOCK ABSORBER REMOVAL/INSTALLATION

id021400801300

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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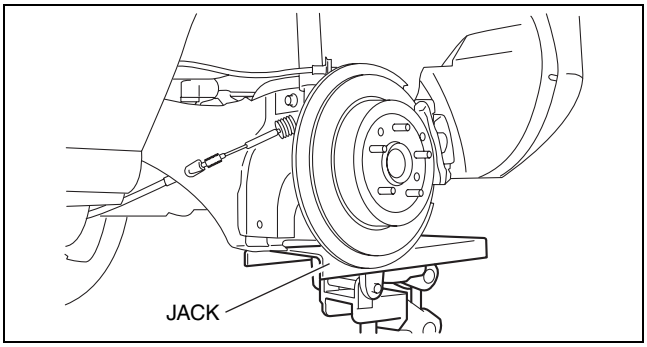
| | |
|---|---|
| 1 | Nut<br>(See 02-14-5 Nut Removal Note) |
| 2 | Rear shock absorber component |
| 3 | Piston rod nut |
| 4 | Retainer |
| 5 | Bushing |
| 6 | Rear shock absorber |

**Nut Removal Note**

1. Support the rear axle with the jack.

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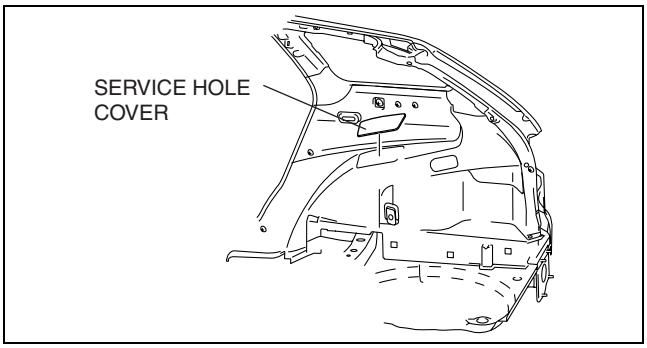
2. Remove the service hole cover on the trunk side trim.
3. Remove the nuts.

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## REAR SHOCK ABSORBER INSPECTION

id021400801400

1. Inspect the rear shock absorber in the same way as the front shock absorber. (See 02-14-5 REAR SHOCK ABSORBER INSPECTION.)

## REAR SHOCK ABSORBER DISPOSAL

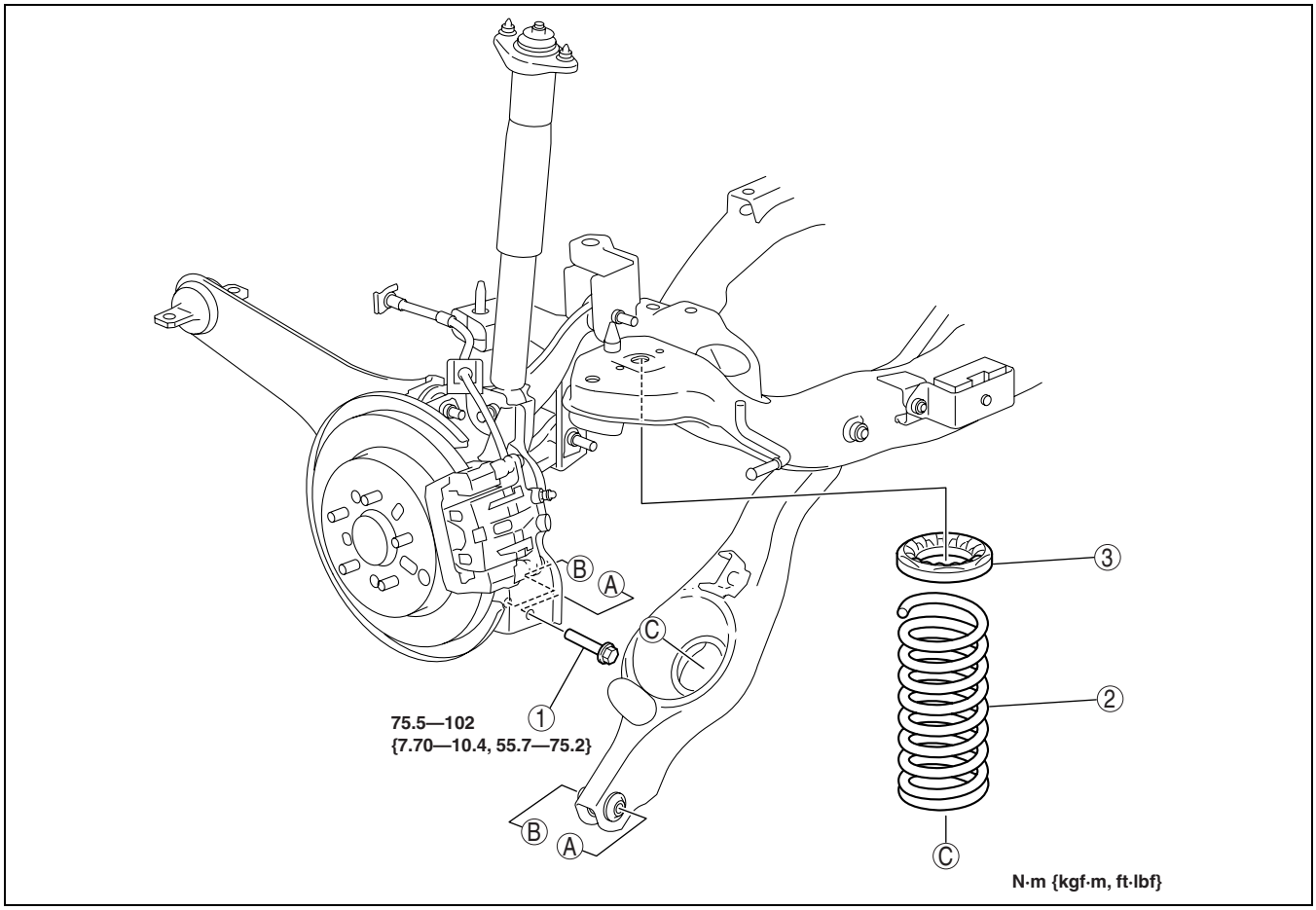
id021400801500

1. Dispose the rear shock absorber in the same way as the front shock absorber. (See 02-14-5 REAR SHOCK ABSORBER DISPOSAL.)

## REAR COIL SPRING REMOVAL/INSTALLATION

id021400800700

1. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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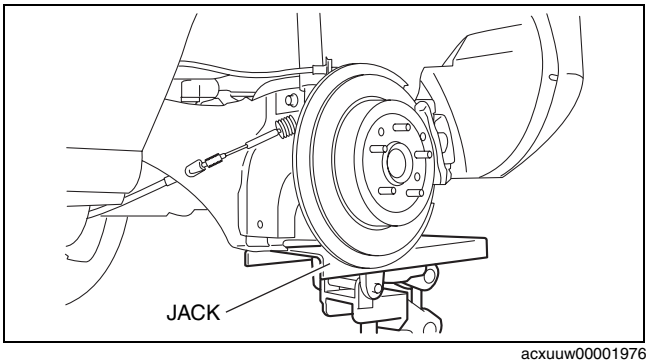
| | |
|---|---|
| 1 | Bolt (rear lower arm outer side) (See 02-14-6 Bolt (Rear Lower Arm Outer Side) Removal Note) |
| 2 | Rear coil spring (See 02-14-7 Rear Coil Spring Installation Note) |
| 3 | Upper spring seat rubber |

### Bolt (Rear Lower Arm Outer Side) Removal Note

1. Raise the rear trailing link to the unloaded condition with a jack.
2. Loosen the inner and outer bolts of the lateral link.
3. Loosen the outer bolt of the upper arm.

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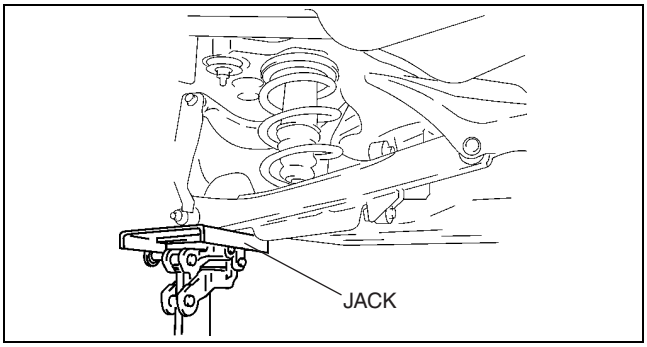
4. Support the lower arm with a jack.
5. Loosen the inner bolt of the lower arm.
6. Remove the outer bolt of the lower arm.
7. Jack down slowly and remove the coil spring.

**Warning**
- **Removing the coil spring is dangerous. The coil spring could fly off, the cause serious injury or death.**

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**Rear Coil Spring Installation Note**

1. Position the jack under the lower arm and jack up slowly.

**Warning**
- **Installing the coil spring is dangerous. The coil spring could fly off, and cause serious injury or death.**

2. Install the lower arm (outer side) bolt.
3. Raise the rear trailing link to the unloaded condition with a jack.
4. Tighten the outer bolt of the upper arm.

**Tightening torque**
- **75.5— 102 N·m {10.0— 12.2 kgf·m, 72.3— 75.2 ft·lbf}**

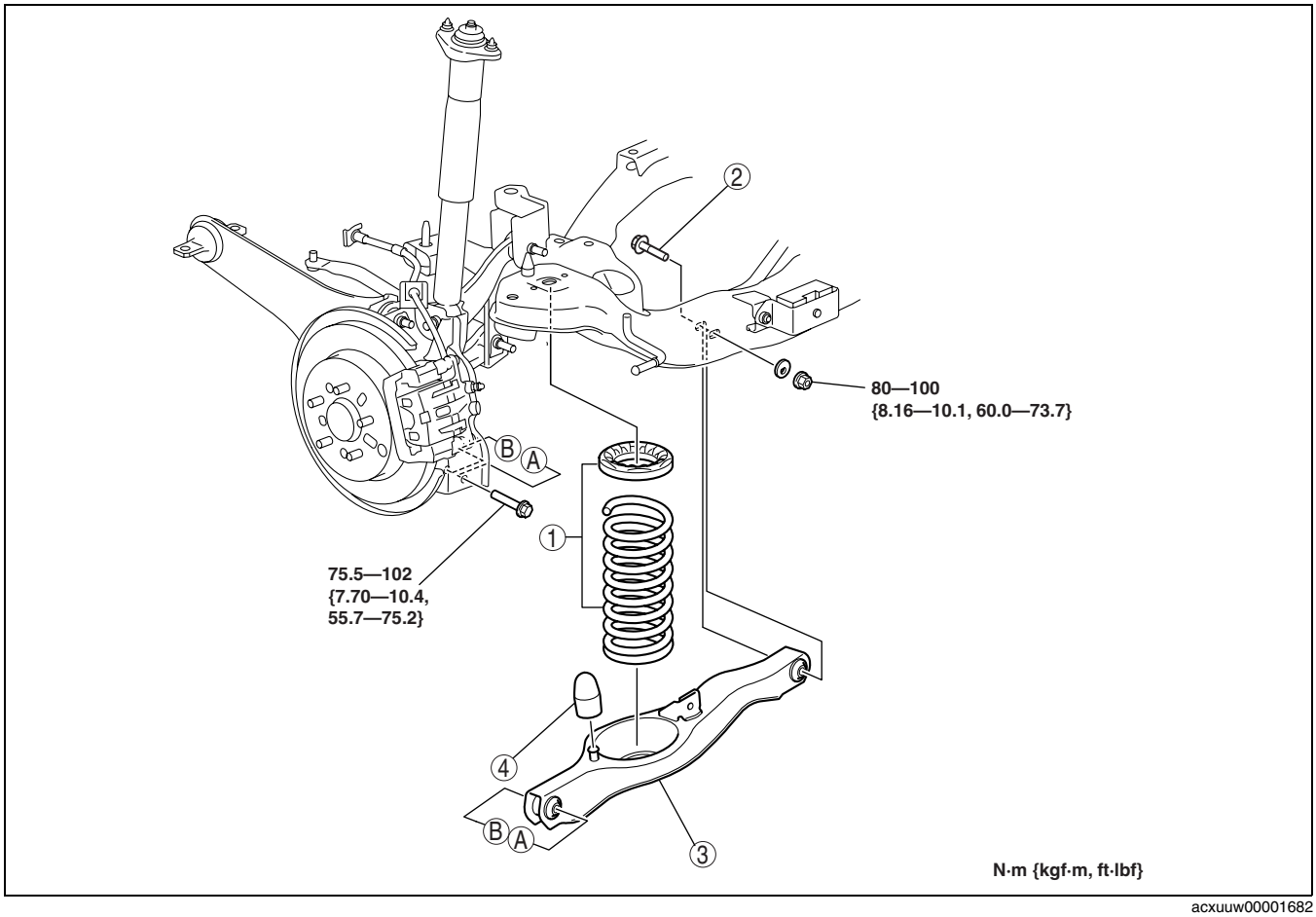
5. Tighten the inner and outer bolts of the lateral link.

**Tightening torque**
- **75.5— 102 N·m {10.0— 12.2 kgf·m, 72.3— 75.2 ft·lbf}**

## REAR LOWER ARM REMOVAL/INSTALLATION

id021400800900

1. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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| | |
|---|---|
| 1 | Rear coil spring component (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.) |

| | |
|---|---|
| 2 | Bolt (rear lower arm inner side) |
| 3 | Rear lower arm |
| 4 | Bound stopper |

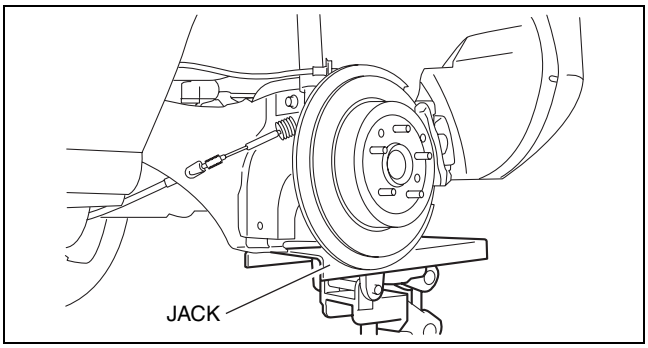
## REAR LATERAL LINK REMOVAL/INSTALLATION

id021400801200

1. Raise the rear trailing link to the unloaded condition with a jack.

**Note**

- Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

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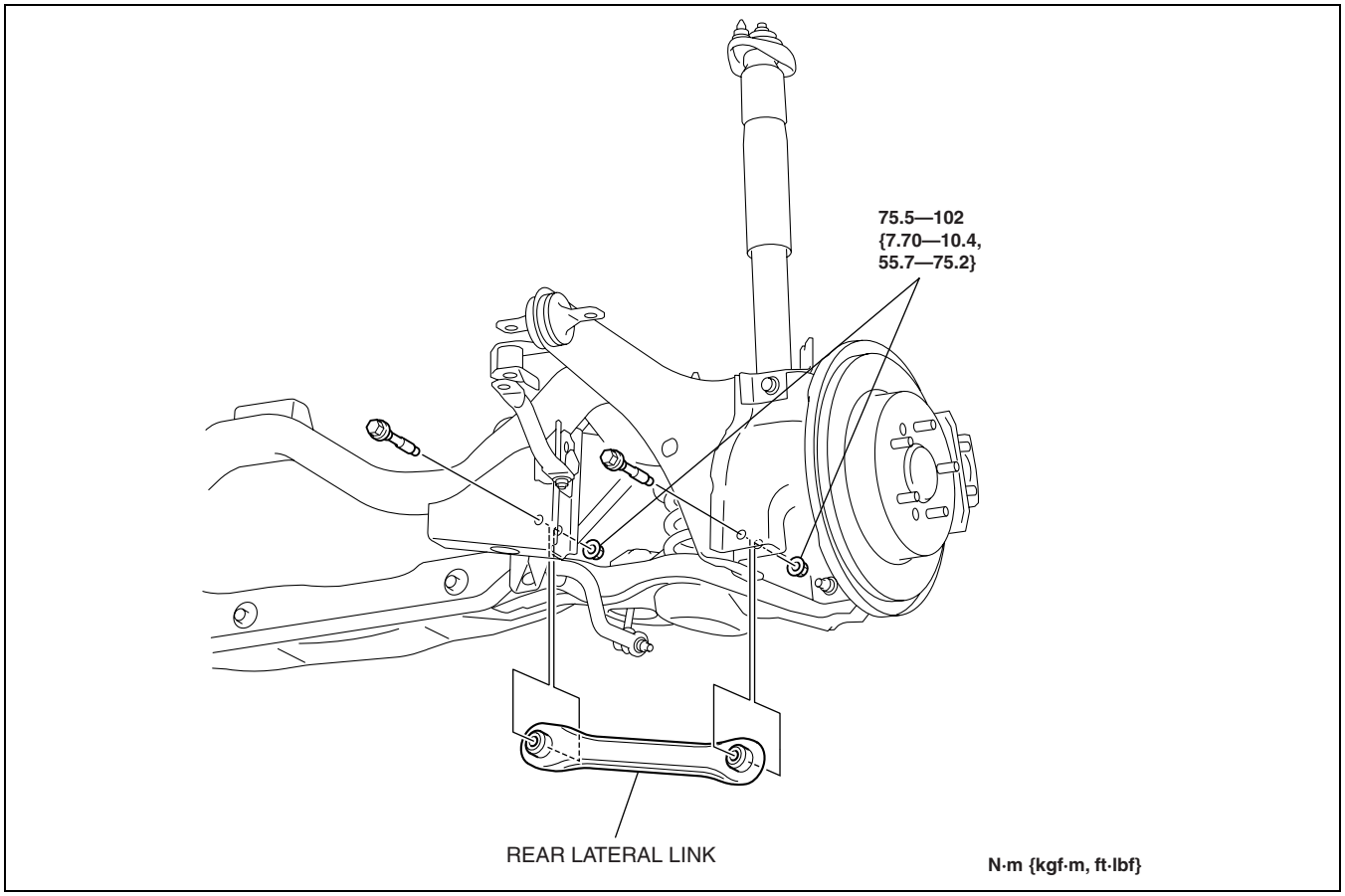
2. Remove the rear lateral link.

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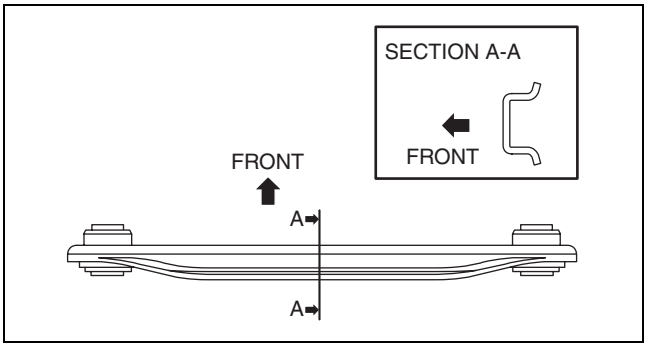
3. Install the rear lateral link shown in the figure.
4. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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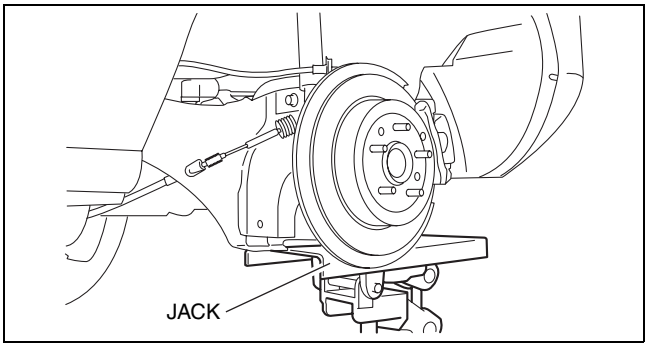
## REAR UPPER ARM REMOVAL/INSTALLATION

id021400800800

1. Raise the trailing link to the unloaded condition with the jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Remove the rear upper arm.

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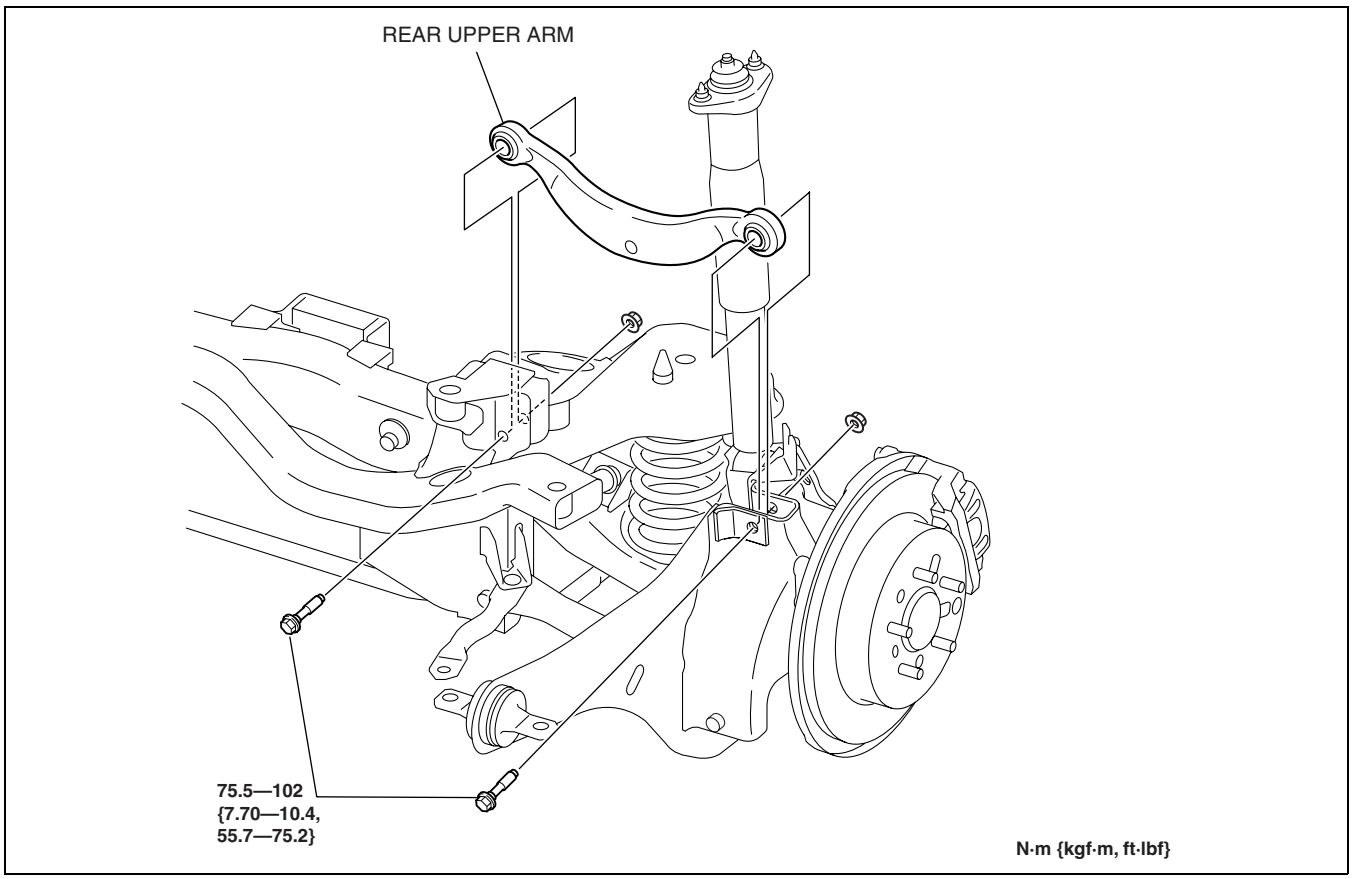


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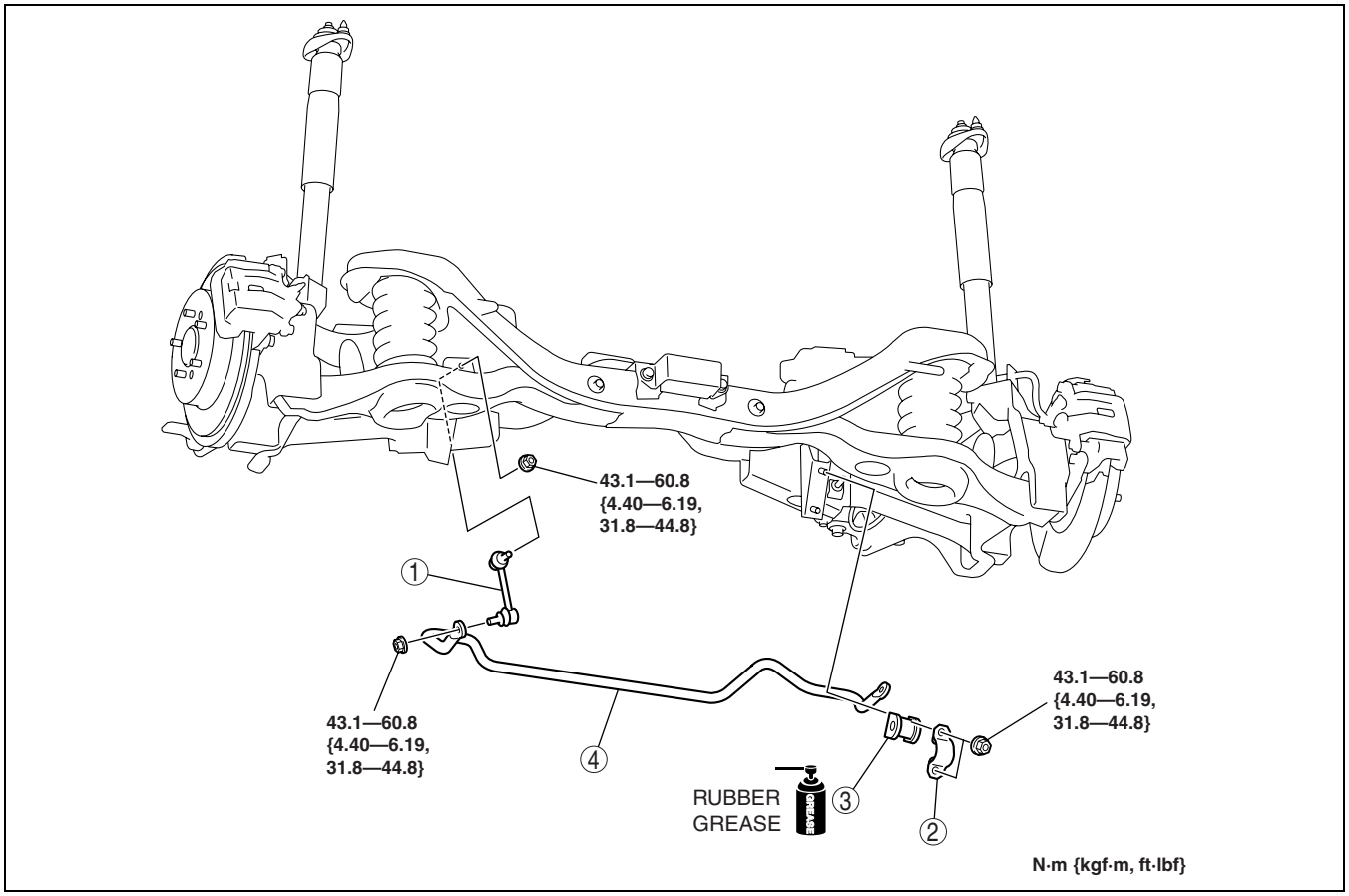
3. Install the rear upper arm.
4. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

## REAR STABILIZER REMOVAL/INSTALLATION

id021400800500

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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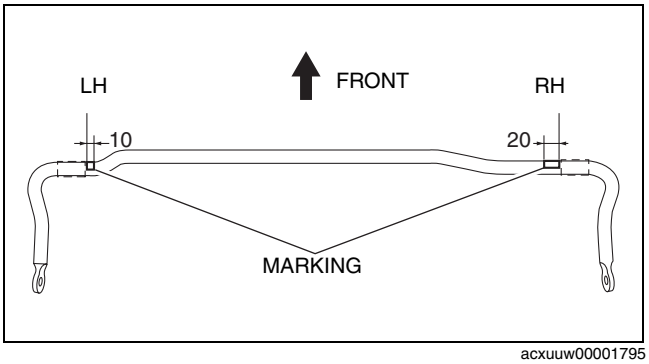
| | |
|---|---|
| 1 | Stabilizer control link<br>(See 02-14-12 Stabilizer Control Link Installation Note.) |
| 2 | Stabilizer bracket |

| | |
|---|---|
| 3 | Bushing<br>(See 02-14-12 Bushing Installation Note.) |
| 4 | Rear stabilizer<br>(See 02-14-11 Rear Stabilizer Installation Note.) |

### Rear Stabilizer Installation Note

1. Install the rear stabilizer so that the side with the wider marking area points towards the right side of the vehicle.

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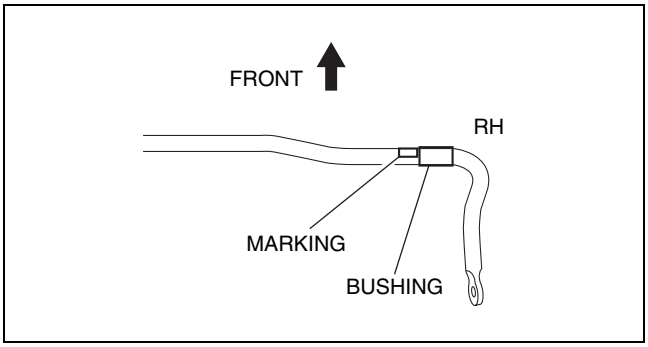
**Bushing Installation Note**

1. Align the outer side of the marking with the stabilizer bushing.

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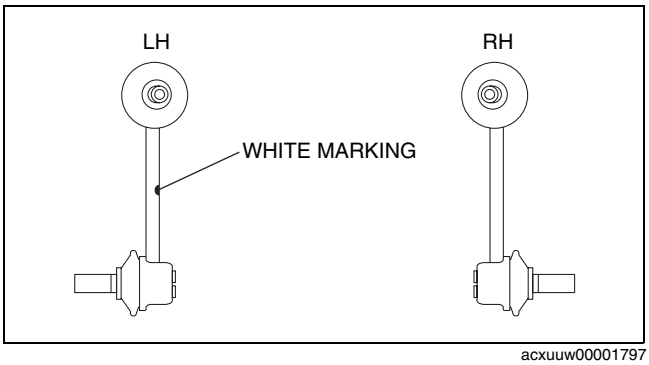
**Stabilizer Control Link Installation Note**

1. Install the control link with white marking to the left side of the vehicle.

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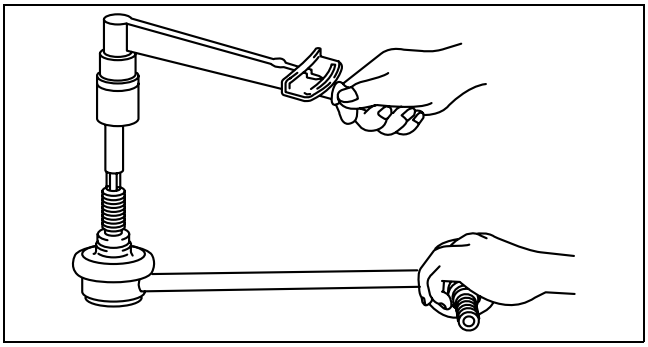
**STABILIZER CONTROL LINK INSPECTION**

id021400800300

1. Remove the stabilizer control link from the vehicle. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
2. Inspect for bending and damage.
3. Measure the ball joint starting torque.
   (1) Rock the ball joint stud side to side 10 times.
   (2) Rotate the ball joint stud 10 times.
   (3) Measure the starting torque using a suitable Allen socket and a torque wrench.

**Rear stabilizer control link ball joint starting torque**
**0.2— 0.8 N·m {2.1— 8.1 kgf·cm, 1.8— 7.0 in·lbf}**



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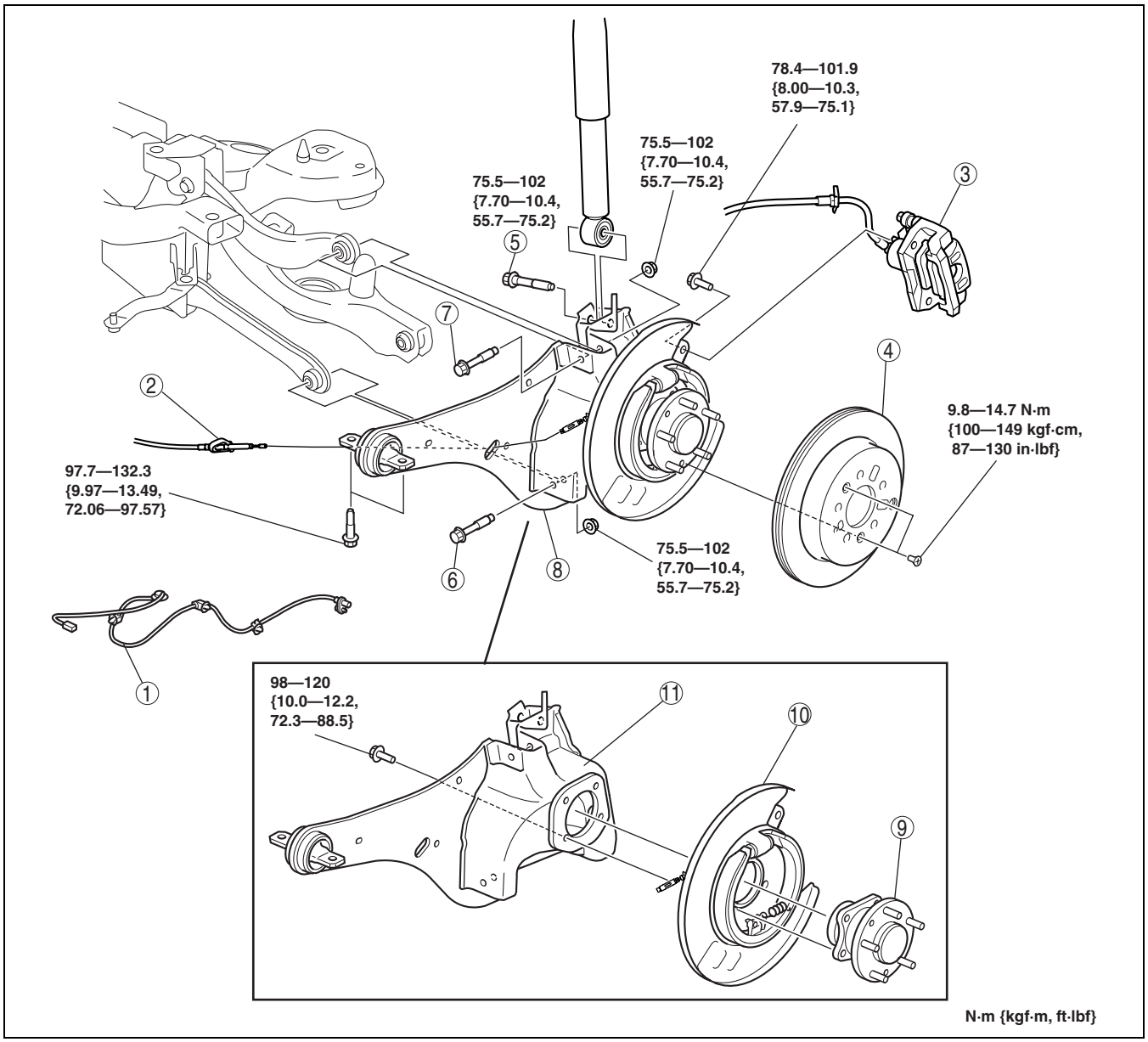
**TRAILING LINK REMOVAL/INSTALLATION[2WD]**

id0214008001a1

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
3. Remove the rear coil spring. (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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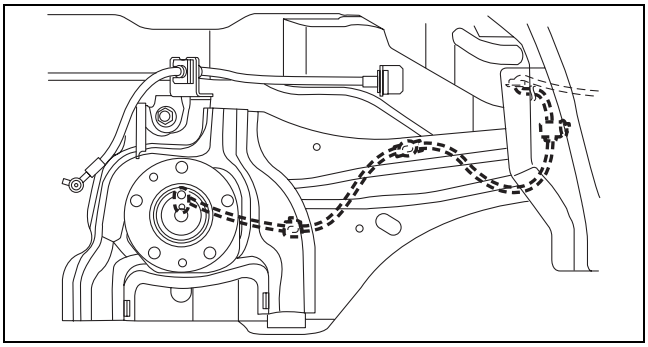
| | |
|---|---|
| 1 | ABS wheel-speed sensor<br>(See 02-14-14 ABS Wheel-speed Sensor Removal Note) |
| 2 | Parking brake cable<br>(See 04-12-3 PARKING BRAKE REMOVAL/ INSTALLATION[2WD].) |
| 3 | Caliper component<br>(See 02-14-14 Caliper Component Removal Note) |
| 4 | Disc plate<br>(See 04-11-22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION.) |
| 5 | Bolt (rear shock absorber lower side)<br>(See 02-14-14 Bolt (Rear Shock Absorber Lower Side) Removal Note) |

| | |
|---|---|
| 6 | Bolt (rear lateral link outer side)<br>(See 02-14-14 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note.)<br>(See 02-14-14 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note.) |
| 7 | Bolt (rear upper arm outer side)<br>(See 02-14-14 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note.)<br>(See 02-14-14 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note.) |
| 8 | Trailing link, rear wheel hub component and parking brake component |
| 9 | Rear wheel hub component<br>(See 03-12-3 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD]) |
| 10 | Parking brake component |
| 11 | Trailing link |

**ABS Wheel-speed Sensor Removal Note**

1. Remove the rear ABS wheel-speed sensor and rear ABS wheel-speed sensor harness connected to the rear trailing link.



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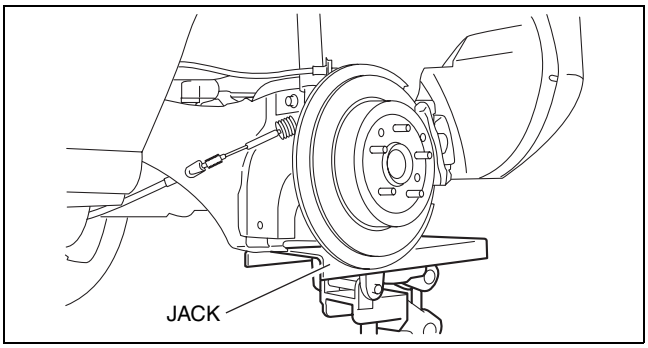
**Caliper Component Removal Note**

1. Suspend the caliper aside with cable.

**Bolt (Rear Shock Absorber Lower Side) Removal Note**

1. Support the trailing link with a jack.
2. Remove the bolts (rear shock absorber lower side).

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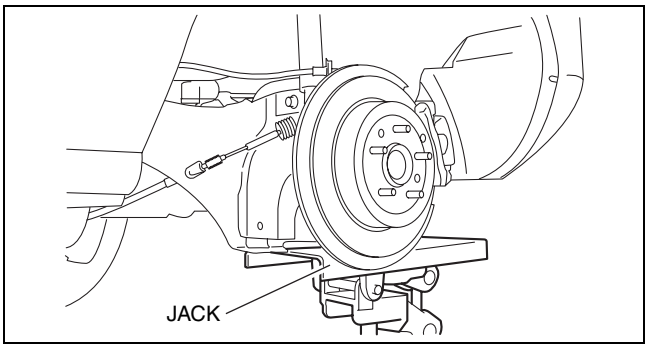
**Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note**

1. Raise the trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Remove the bolts (rear lateral link outer side and rear upper arm outer side).

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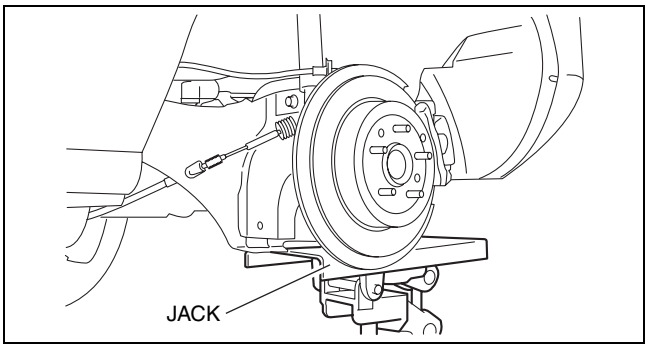
**Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note**

1. Raise the rear trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Tighten the bolts (rear lateral link outer side and rear upper arm outer side).

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## TRAILING LINK REMOVAL/INSTALLATION[AWD]

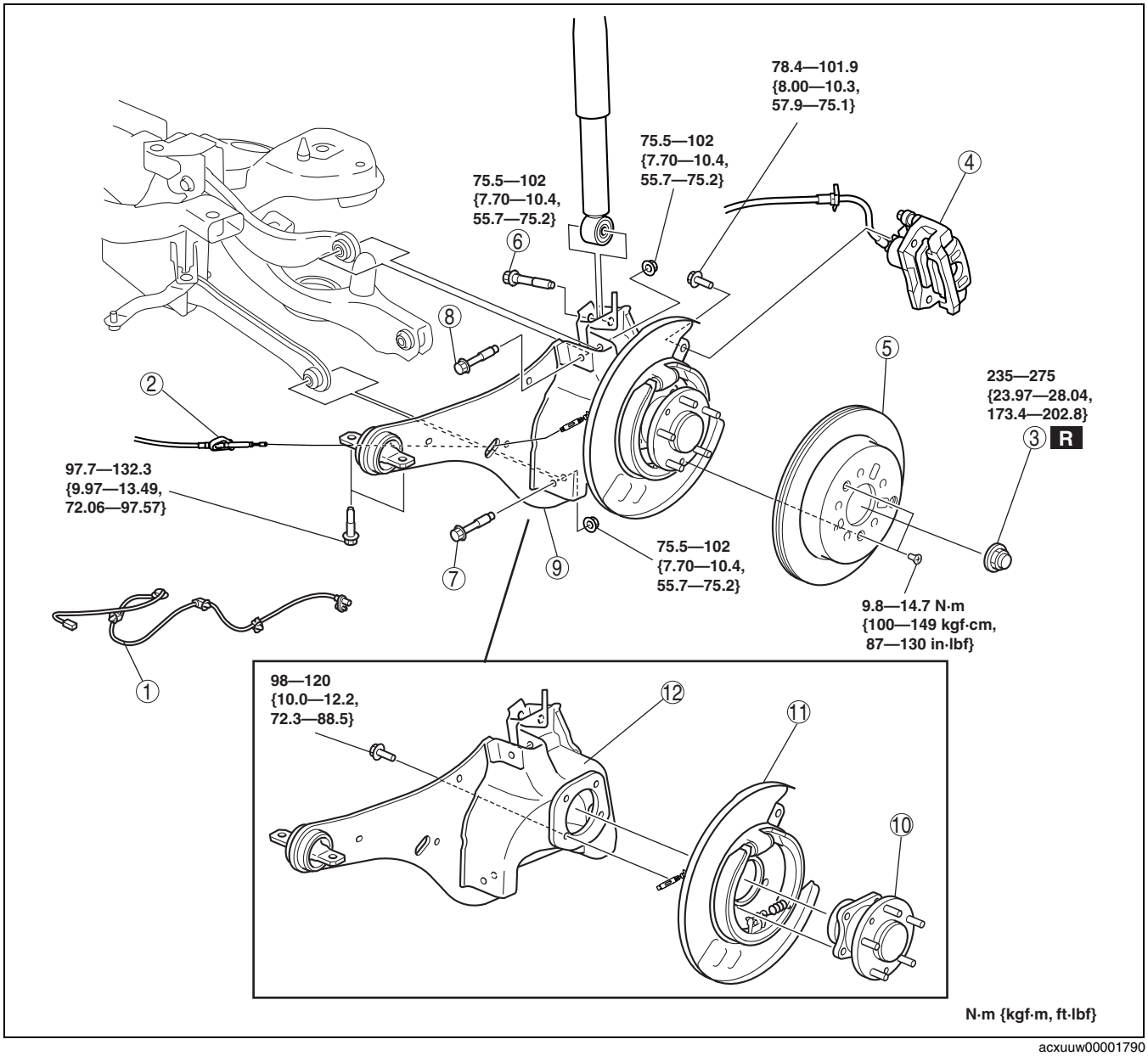
id0214008001a3

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC]
2. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION
3. Remove the rear coil spring. (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)



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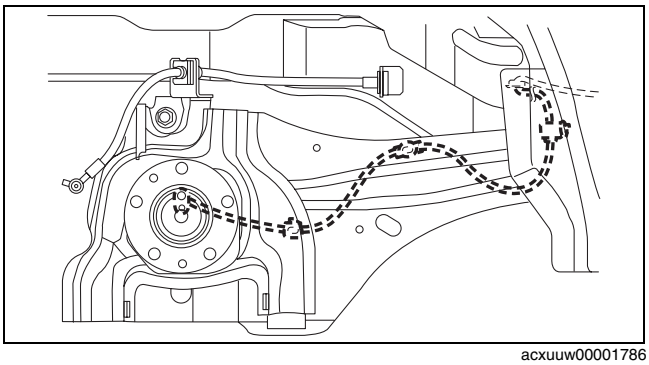
| | | | |
|---|---|---|---|
| 1 | Rear ABS wheel-speed sensor<br>(See 02-14-16 Rear ABS Wheel-speed Sensor Removal Note) | 3 | Locknut<br>(See 03-12-5 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[AWD]) |
| 2 | Parking brake cable<br>(See 04-12-8 PARKING BRAKE REMOVAL/INSTALLATION[AWD].) | 4 | Brake caliper component<br>(See 02-14-16 Brake Caliper Component Removal Note |

| | |
|---|---|
| 5 | Disc plate<br>(See 04-11-22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION.) |
| 6 | Bolt (rear shock absorber lower side)<br>(See 02-14-16 Bolt (Rear Shock Absorber Lower Side) Removal Note.) |
| 7 | Bolt (rear lateral link outer side)<br>(See 02-14-16 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note.)<br>(See 02-14-17 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note.) |
| 8 | Bolt (rear upper arm outer side)<br>(See 02-14-16 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note.)<br>(See 02-14-17 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note.) |
| 9 | Trailing link, rear wheel hub component and parking brake component |
| 10 | Rear wheel hub component |
| 11 | Parking brake component |
| 12 | Trailing link |

**Rear ABS Wheel-speed Sensor Removal Note**

1. Remove the rear ABS wheel-speed sensor and rear ABS wheel-speed sensor harness connected to the rear trailing link.



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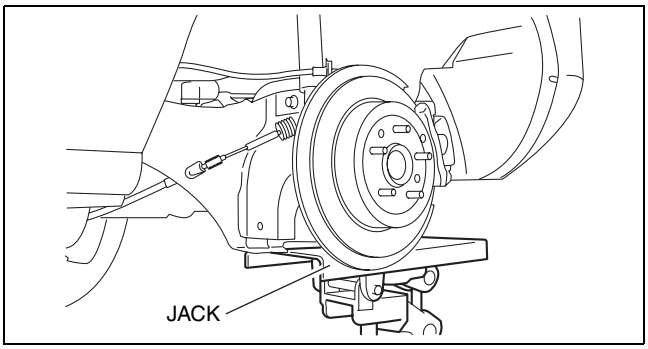
**Brake Caliper Component Removal Note**

1. Suspend the caliper aside with cable.

**Bolt (Rear Shock Absorber Lower Side) Removal Note**

1. Support the trailing link with a jack.
2. Remove the bolt.

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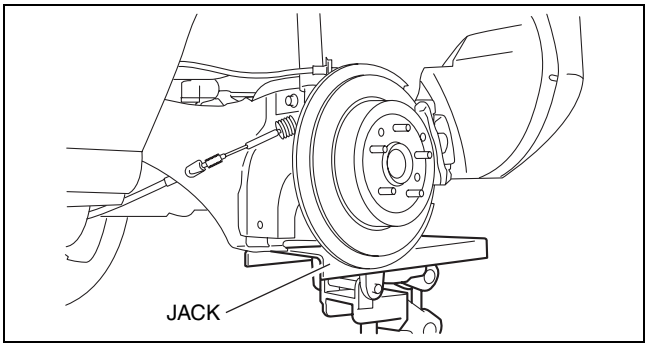
**Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note**

1. Raise the trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Remove the bolts (rear lateral link outer side and rear upper arm outer side).

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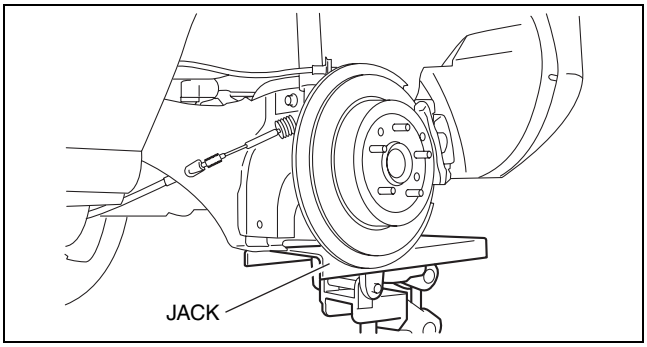
**Rear Trailing Link Component Removal Note**

1. Support the trailing link with a jack.

   **Caution**
   - **Removing the trailing link is dangerous. The trailing link could fall and cause serious injury or death. Verify that the jack securely supports the trailing link.**

2. Separate the rear drive shaft (rear axle side) from the wheel hub.
3. Remove the rear trailing link.

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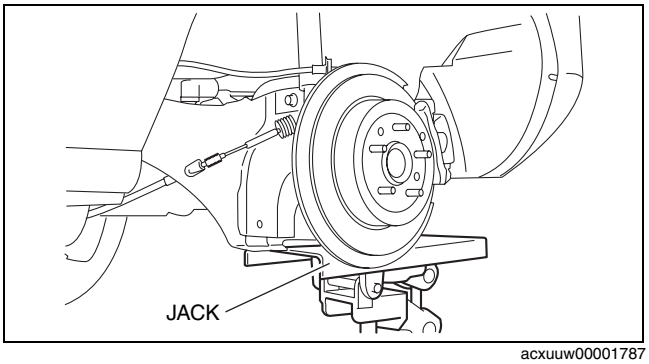
**Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note**

1. Raise the rear trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Tighten the bolts (rear lateral link outer side and rear upper arm outer side).

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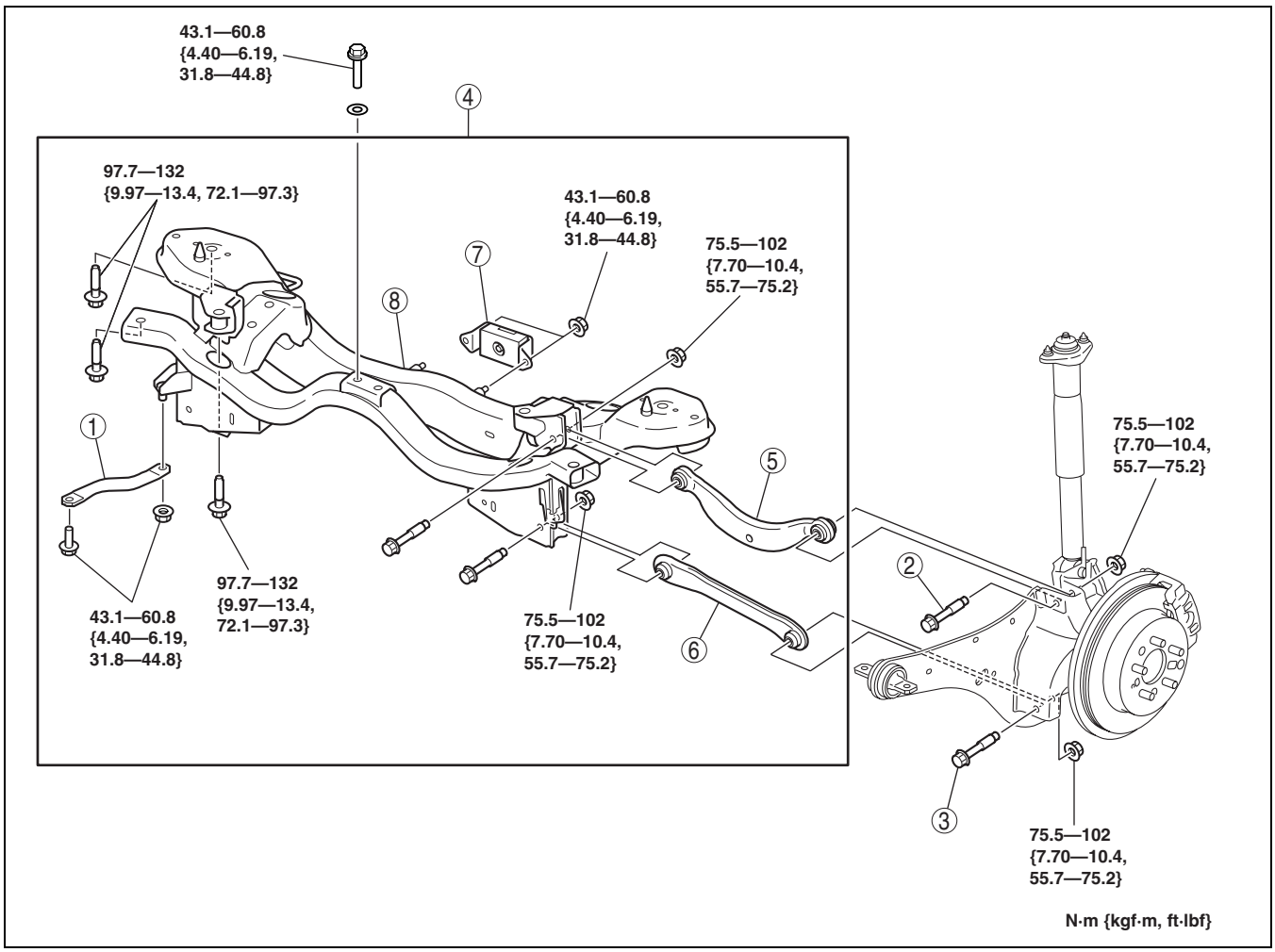
## REAR CROSSMEMBER REMOVAL/INSTALLATION[2WD]

id0214008010a1

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove the center trunk board.
2. Remove the main silencer and middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
4. Remove the rear coil spring. (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.)
5. Remove the rear lower arm. (See 02-14-8 REAR LOWER ARM REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.
8. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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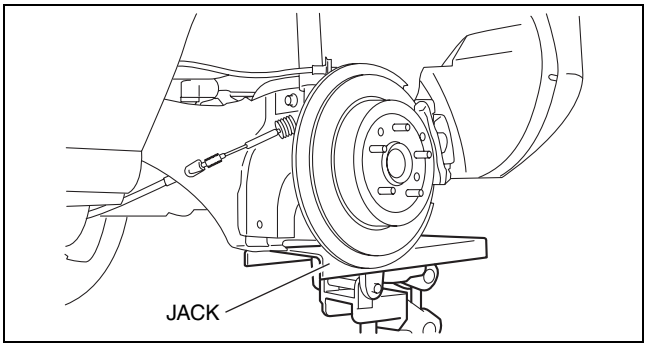
| | |
|---|---|
| 1 | Rear cross bar<br>(See 02-14-19 Rear Cross Bar Installation Note.) |
| 2 | Bolt (rear upper arm outer side)<br>(See 02-14-19 Bolt (Rear Upper Arm Outer Side And Rear Lateral Link Outer Side) Removal Note.)<br>(See 02-14-19 Bolt (Rear Upper Arm Outer Side And Rear Lateral Link Outer Side) Installation Note.) |
| 3 | Bolt (rear lateral link outer side)<br>(See 02-14-19 Bolt (Rear Upper Arm Outer Side And Rear Lateral Link Outer Side) Removal Note.)<br>(See 02-14-19 Bolt (Rear Upper Arm Outer Side And Rear Lateral Link Outer Side) Installation Note.) |
| 4 | Rear crossmember component<br>(See 02-14-19 Rear Crossmember Component Removal Note.) |
| 5 | Rear upper arm |
| 6 | Rear lateral link |
| 7 | Dynamic damper |
| 8 | Rear crossmember |

**Bolt (Rear Upper Arm Outer Side And Rear Lateral Link Outer Side) Removal Note**

1. Raise the rear trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Remove the bolts (rear upper arm outer side and rear lateral link outer side).

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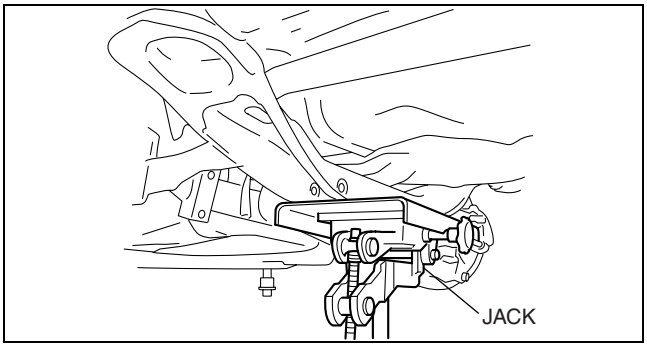
**Rear Crossmember Component Removal Note**

**Warning**
- **Removing the crossmember is dangerous. The crossmember component could fall and cause serious injury or death. Verify that the jack securely supports the crossmember component.**

1. Support the crossmember component using a jack and remove the nuts.
2. Remove the crossmember component.

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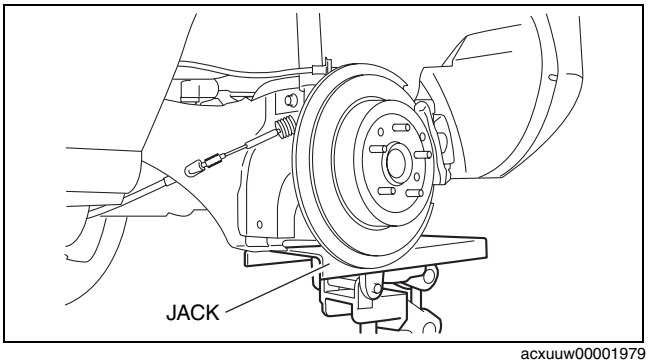
**Bolt (Rear Upper Arm Outer Side And Rear Lateral Link Outer Side) Installation Note**

1. Raise the rear trailing link to the unloaded condition with a jack.
2. Tighten the bolts (rear upper arm outer side and rear lateral link outer side).

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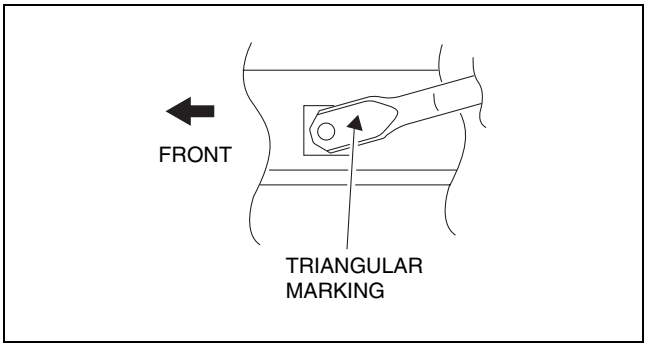
**Rear Cross Bar Installation Note**

1. Install the cross bar so that the triangular marking is facing to the front of the vehicle.

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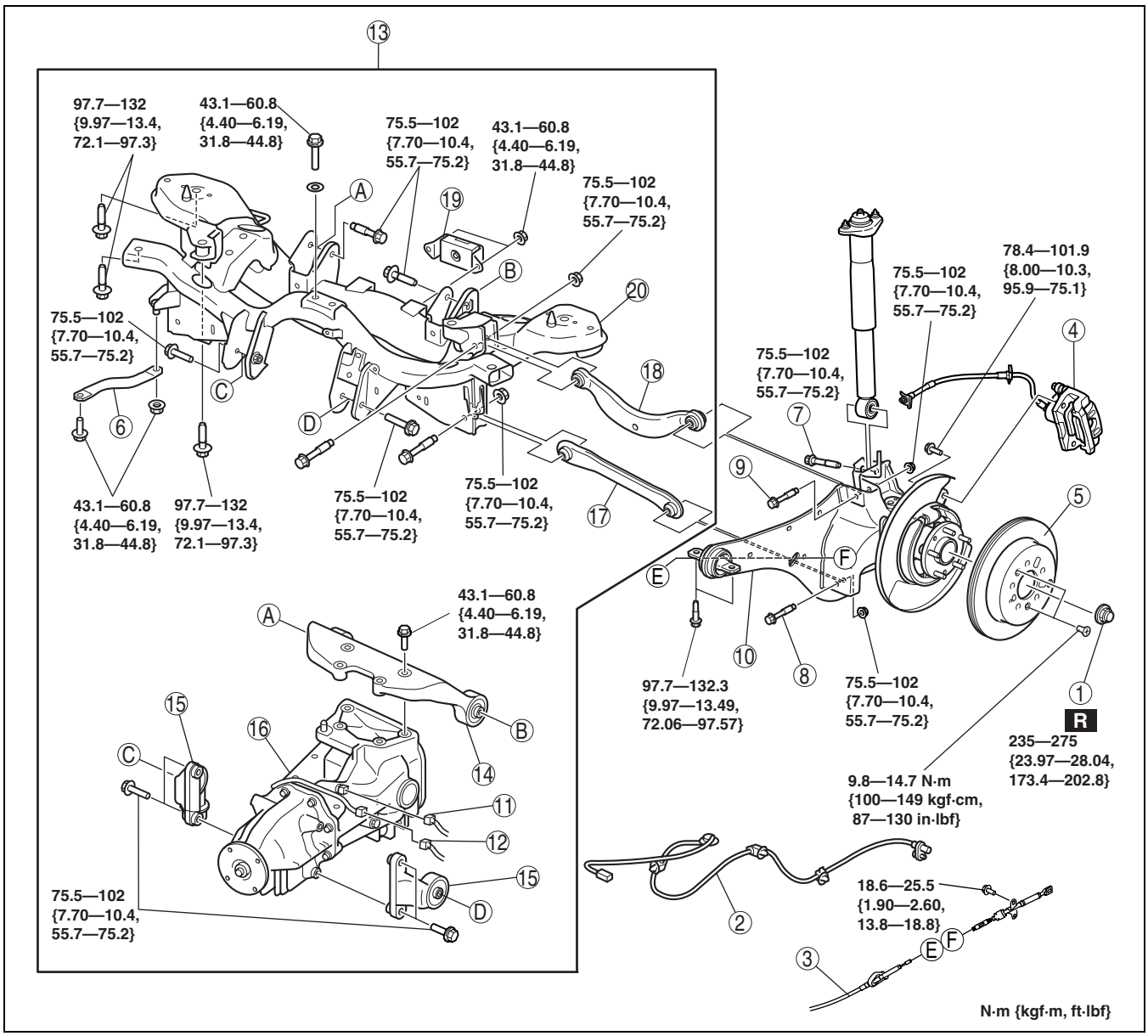
## REAR CROSSMEMBER REMOVAL/INSTALLATION[AWD]

id0214008010a3

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Remove the center trunk board.
2. Remove the main silencer and middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the propeller shaft. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
5. Remove the rear coil spring. (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.)
6. Remove the lower arm (See 02-14-8 REAR LOWER ARM REMOVAL/INSTALLATION.)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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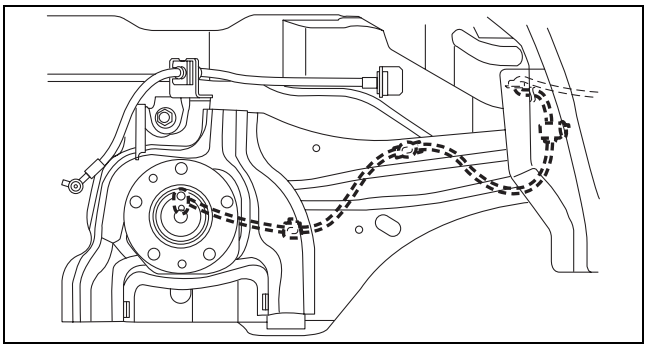
| | |
|---|---|
| 1 | Locknut<br>(See 03-12-5 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[AWD].) |
| 2 | Rear ABS wheel-speed sensor<br>(See 02-14-21 Rear ABS Wheel-speed Sensor Removal Note.) |

| | |
|---|---|
| 3 | Parking brake cable |
| 4 | Brake caliper component<br>(See 02-14-21 Brake Caliper Component Removal Note) |
| 5 | Disc plate<br>(See 04-11-22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION.) |
| 6 | Rear cross bar<br>(See 02-14-22 Rear Cross Bar Installation Note.) |
| 7 | Bolt (rear shock absorber lower side)<br>(See 02-14-21 Bolt (Rear Shock Absorber Lower Side) Removal Note.) |
| 8 | Bolt (rear lateral link outer side)<br>(See 02-14-22 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note.)<br>(See 02-14-22 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note.) |
| 9 | Bolt (rear upper arm outer side)<br>(See 02-14-22 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note.)<br>(See 02-14-22 Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note.) |
| 10 | Rear trailing link and wheel hub component<br>(See 02-14-15 TRAILING LINK REMOVAL/ INSTALLATION[AWD].) |
| 11 | Differential oil temperature sensor connector |
| 12 | AWD solenoid connector |
| 13 | Rear crossmember and rear differential component<br>(See 02-14-22 Rear Crossmember And Rear Differential Removal Note.) |
| 14 | Rear differential mounting rubber |
| 15 | Front differential mounting rubber |
| 16 | Rear differential |
| 17 | Rear lateral link |
| 18 | Rear upper arm |
| 19 | Dynamic damper |
| 20 | Rear crossmember |



**Rear ABS Wheel-speed Sensor Removal Note**

1. Remove the rear ABS wheel-speed sensor and rear ABS wheel-speed sensor harness connected to the trailing link.



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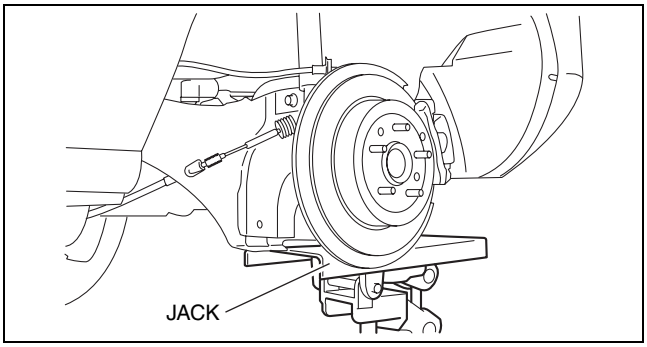
**Brake Caliper Component Removal Note**

1. Remove the caliper, and suspend it aside with cable.

**Bolt (Rear Shock Absorber Lower Side) Removal Note**

1. Support the trailing link with a jack.
2. Remove the bolt (rear shock absorber lower side).

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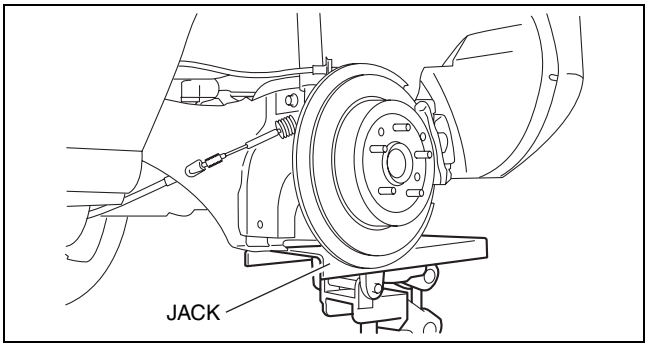
**Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Removal Note**

1. Raise the rear trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Remove the bolts (rear lateral link outer side and rear upper arm outer side).

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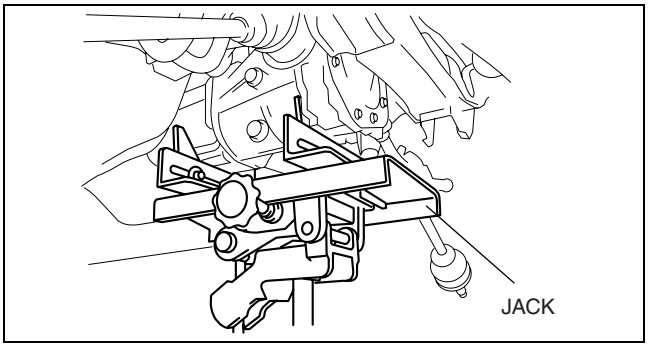
**Rear Crossmember And Rear Differential Removal Note**

**Warning**
- **Removing the crossmember is dangerous. The crossmember component could fall and cause serious injury or death. Verify that the jack securely supports the crossmember component.**

1. Support the rear crossmember component with a jack.
2. Remove the rear crossmember component.

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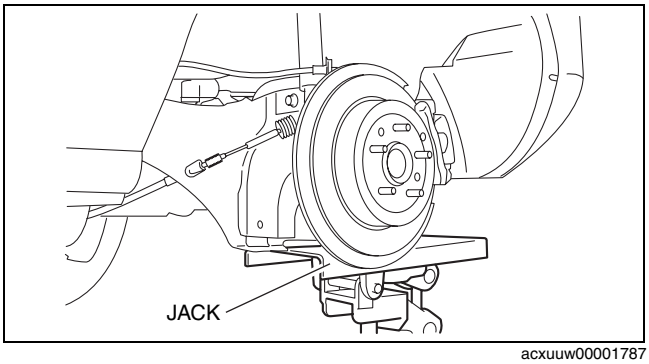
**Bolts (Rear Lateral Link Outer Side And Rear Upper Arm Outer Side) Installation Note**

1. Raise the rear trailing link to the unloaded condition with a jack.

   **Note**
   - Jacking up the rear suspension to the no-occupant position will lighten the force on the bushing and make it easier to perform the procedure.

2. Tighten the bolts (rear lateral link outer side and rear upper arm outer side).

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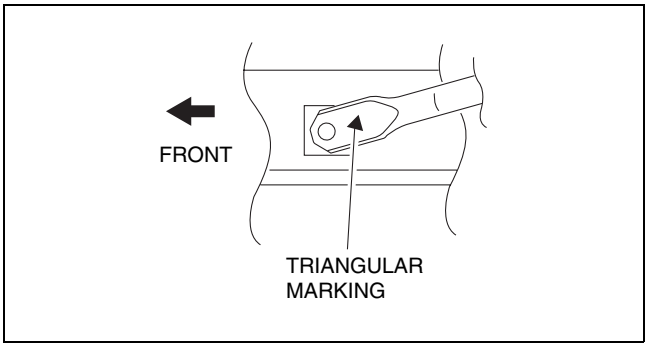
**Rear Cross Bar Installation Note**

1. Install the cross bar so that the triangular marking is facing to the front of the vehicle.

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# 02-50 TECHNICAL DATA

**SUSPENSION TECHNICAL DATA . . . . . 02-50–1**

## SUSPENSION TECHNICAL DATA

id025000800100

### Front wheel alignment (Unloaded)*1

| Item | | | Fuel gauge indication | | | | |
|---|---|---|---|---|---|---|---|
| | | | Empty | 1/4 | 1/2 | 3/4 | Full |
| Maximum steering angle [Tolerance ±3°] | | Inner | 36°06′ | | | | |
| | | Outer | 30°54′ | | | | |
| Total toe-in | [Tolerance ±2 {±0.08}] | (mm {in}) | 0 {0.00} | | | | |
| | | (degree) | 0°00′±0°09′ | | | | |
| Caster angle*2 [Tolerance ±1°] | | | 3°02′ | 3°05′ | 3°08′ | 3°10′ | 3°12′ |
| Camber angle*2 [Tolerance ±1°] | | | −0°19′ | | | −0°20′ | |
| Steering axis inclination (Reference value) | | | 11°42′ | | 11°43′ | | 11°44′ |

*1 : Engine coolant and engine oil are at specified level. Spare tire, jack and tools are in designated position.
*2 : Difference between left and right must not exceed **1°30′.**

### Rear wheel alignment (Unloaded)*1

| Item | | | Fuel gauge indication | | | | |
|---|---|---|---|---|---|---|---|
| | | | Empty | 1/4 | 1/2 | 3/4 | Full |
| Total toe-in | [Tolerance ±4 {±0.16}] | (mm {in}) | 2 {0.08} | | | | |
| | | (degree) | 0°10′±0°20′ | | | | |
| Camber angle*2 (Reference value) [Tolerance ±1°] | | | −0°51′ | −0°54′ | −0°57′ | −1°00′ | −1°03′ |
| Thrust angle (Reference value) [Tolerance ±0°48′] | | | 0° | | | | |

*1 : Engine coolant and engine oil are at specified level. Spare tire, jack and tools are in designated position.
*2 : Difference between left and right must not exceed **1°30′.**

## Wheel and tire

| Item | | | Specification | |
|---|---|---|---|---|
| **Standard tire and wheel** | | | | |
| Wheel | Size | | 18 × 7 1/2J | |
| | Offset | (mm {in}) | 50 {1.97} | |
| | Pitch circle diameter | (mm {in}) | 114.3 {4.50} | |
| | Material | | Aluminum alloy | |
| Tire | Size | | P235/60R18 102H | 235/60R18 103H (Mexico spec.) |
| | Air pressure (kPa {kgf/cm$^2$, psi}) | Front | 220 {2.2, 32} | 230 {2.3, 34} (Mexico spec.) |
| | | Rear | 220 {2.2, 32} | 230 {2.3, 34} (Mexico spec.) |
| | Remaining tread | (mm {in}) | 1.6 {0.06} | |
| Wheel and tire | Wheel and tire runout (mm {in}) | Radial direction | 1.5 {0.06} max. | |
| | | Lateral direction | 2.0 {0.08} max. | |
| | Wheel imbalance | (g {oz}) | Adhesive-type*1: 10 {0.35} max.<br>Knock-type*2: 6 {0.21} max. | |
| | Tightening torque | (N·m {kgf·m, ft·lbf}) | 88.2—117.6 {9.00—11.99, 65.06—86.73} | |
| **Temporary spare tire** | | | | |
| Wheel | Size | | 18 × 4T | 16 × 5J |
| | Offset | (mm {in}) | 40 {1.57} | 45 {1.77} |
| | Pitch circle diameter | (mm {in}) | 114.3 {4.50} | |
| | Material | | Steel | |
| Tire | Size | | T155/90D18 103M | 205/80R16 100M |
| | Air pressure (kPa {kgf/cm$^2$, psi}) | | 420 {4.2, 60} | 250 {2.5, 36} |
| Wheel and tire | Wheel and tire runout (mm {in}) | Radial direction | 2.0 {0.08} max. | |
| | | Lateral direction | 2.5 {0.10} max. | |

*1 : Total weight exceeds **160 g {5.65 oz}**.
*2 : One balance weight: **60 g {2.12 oz} max.** If the total weight exceeds **100 g {3.53 oz}** on one side, rebalance after moving the tire around on the rim. Do not use three or more balance weights.

## Suspension

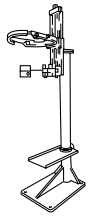
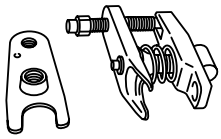
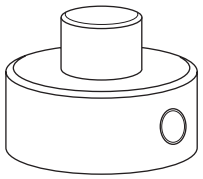
| Item | Specification |
|---|---|
| Front lower arm rotational torque | 1.4—2.0 N·m {15—20 kgf·cm, 13—17 in·lbf} |
| Front stabilizer control link ball joint starting torque | 0.2—0.9 N·m {2.1—9.1 kgf·cm, 1.8—7.9 in·lbf} |
| Rear stabilizer control link ball joint starting torque | 0.2—0.8 N·m {2.1—8.1 kgf·cm, 1.8—7.0 in·lbf} |

# 02-60 SERVICE TOOLS

**SUSPENSION SST . . . . . 02-60–1**

## SUSPENSION SST

id026000800100

| | | |
|---|---|---|
| 49 T034 1A0<br>Coil spring compressor set  | 49 T028 3A0<br>Ball Joint Puller set  | 49 FT01 389<br>Preload adapter  |

# DRIVELINE/AXLE

**03**
SECTION


**ON-BOARD DIAGNOSTIC . . . . 03-02**
**SYMPTOM TROUBLESHOOTING . . . . . 03-03**
**GENERAL PROCEDURES . . . . 03-10**
**FRONT AXLE . . . . . 03-11**
**REAR AXLE . . . . . 03-12**
**DRIVE SHAFT . . . . . 03-13**
**DIFFERENTIAL . . . . . 03-14**
**PROPELLER SHAFT . . . . . 03-15**
**TRANSFER . . . . . 03-16**
**ALL WHEEL DRIVE (AWD) . . . 03-19**
**TECHNICAL DATA . . . . . 03-50**
**SERVICE TOOLS . . . . . 03-60**

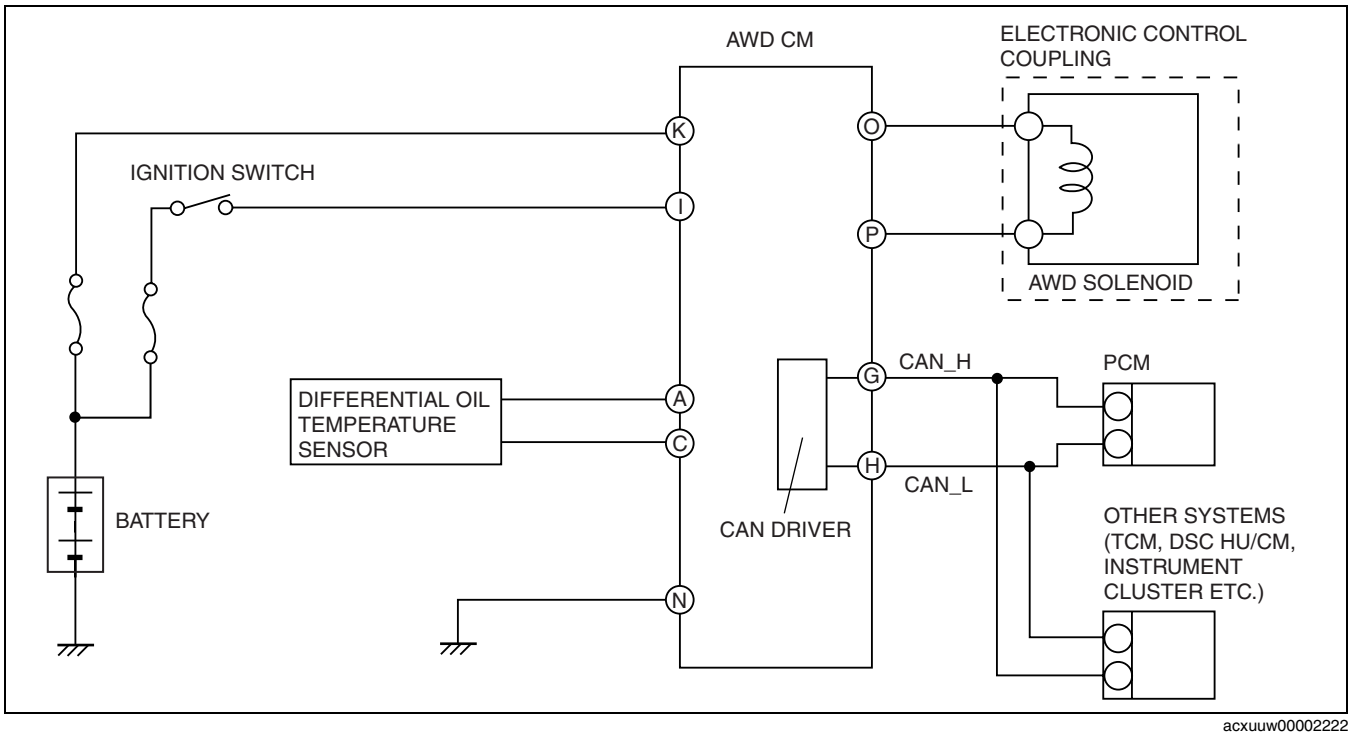



## 03-02 ON-BOARD DIAGNOSTIC


**ELECTRONIC AWD CONTROL SYSTEM WIRING DIAGRAM . . . . . 03-02–1**
**ELECTRONIC AWD CONTROL SYSTEM ON-BOARD DIAGNOSIS . . . . 03-02–2**
Reading DTCs Procedure . . . . . **03-02–2**
Clearing DTCs Procedures . . . . . **03-02–2**
DTC Table . . . . . **03-02–2**
**DTC P1887 . . . . . 03-02–3**
**DTC P1888 . . . . . 03-02–5**


### ELECTRONIC AWD CONTROL SYSTEM WIRING DIAGRAM

id030200800100

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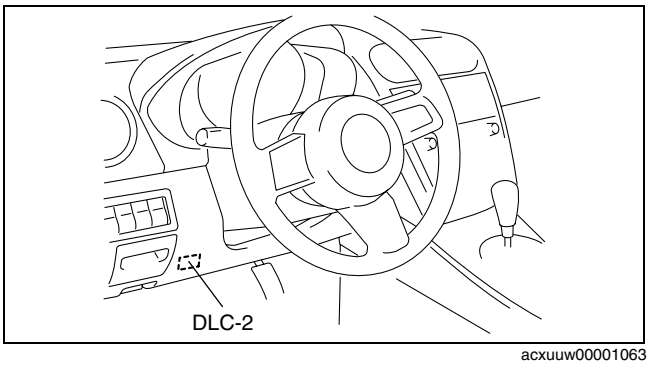
## ELECTRONIC AWD CONTROL SYSTEM ON-BOARD DIAGNOSIS

id030200800200

### Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “4WD”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “4WD”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the AWD CM. (See 03-02-2 Clearing DTCs Procedures)

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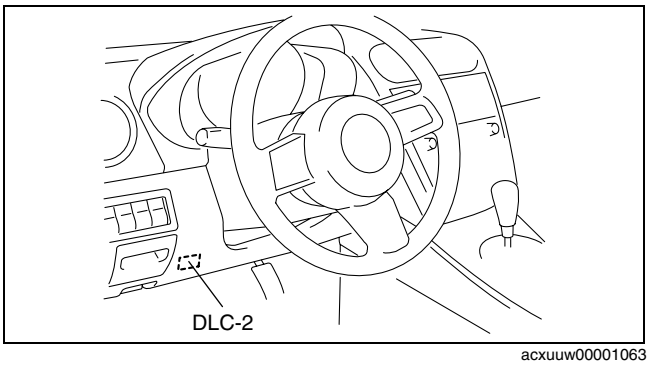
### Clearing DTCs Procedures

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “4WD”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “4WD”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTCs are displayed.

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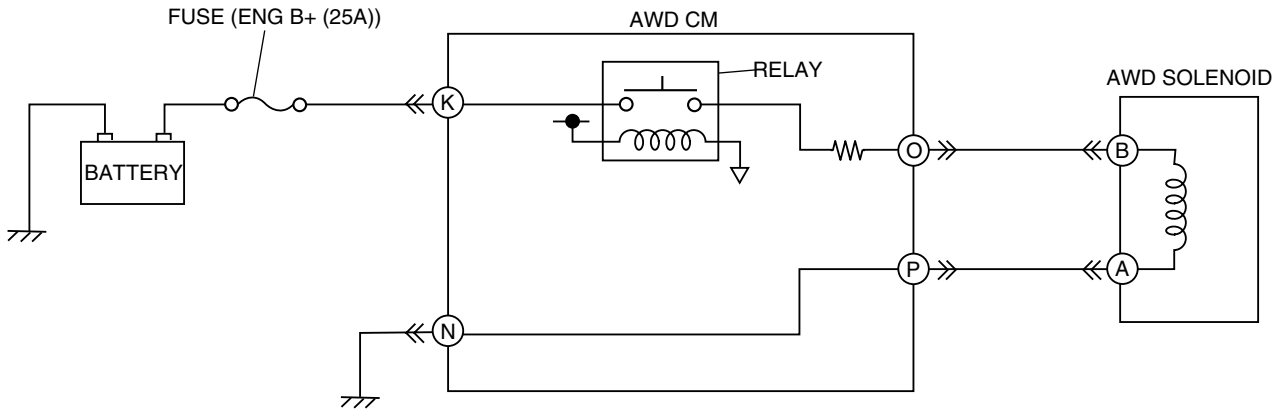
### DTC Table

| DTC | Diagnosis system component | Page |
|---|---|---|
| P1887 | AWD solenoid circuit | (See 03-02-3 DTC P1887) |
| P1888 | Differential oil temperature sensor circuit | (See 03-02-5 DTC P1888) |
| U0073 | CAN system communication error | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |
| U0100 | Communication error to PCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |
| U0101 | Communication error to TCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |
| U0121 | Communication error to DSC HU/CM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |
| U0155 | Communication error to instrument cluster | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |

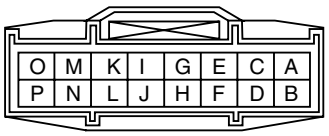
## DTC P1887

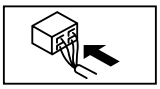
id030200800300

| DTC P1887 | AWD solenoid circuit |
|---|---|
| DETECTION CONDITION | • Current detection circuit in AWD CM detects current above specification for more than specified period.<br>• AWD CM detects that AWD solenoid control signal differs from current detected at current detection circuit for more than specified period.<br>• Relay voltage detection circuit detects that voltage does not concur with relay ON/OFF signal for more than specified period. |
| POSSIBLE CAUSE | • Open circuit or short to GND in harness between battery and AWD CM terminal K<br>• Open circuit or short to GND between AWD CM terminal O and AWD solenoid terminal B<br>• Open circuit or short to GND between AWD CM terminal P and AWD solenoid terminal A<br>• Open circuit between AWD CM terminal N and body GND<br>• Open or short circuit in AWD CM internal circuit<br>• ENG B+ (25A) fuse malfunction<br>• AWD solenoid malfunction<br>• AWD CM malfunction<br>• Poor connection of connectors (female terminals) |

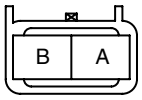


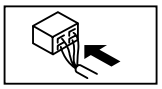

AWD CM CONNECTOR



AWD SOLENOID CONNECTOR



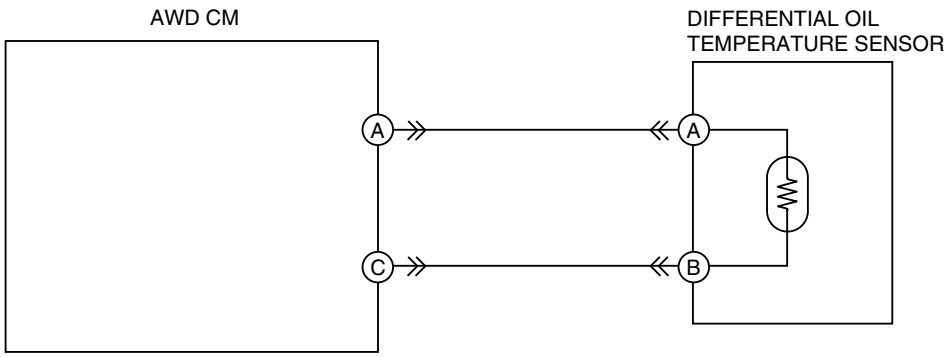
**Diagnostic procedure**

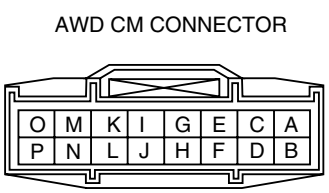
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT AWD SOLENOID CONDITION**<br>• Turn ignition key to OFF.<br>• Disconnect AWD solenoid connector.<br>• Inspect AWD solenoid. (See 03-19-11 AWD SOLENOID INSPECTION)<br>• Is it okay? | Yes | Go to next step. |
| | | No | Replace AWD solenoid, then go to Step 7. |
| 2 | **INSPECT AWD SOLENOID TO AWD CM (POWER SUPPLY CIRCUIT) FOR OPEN CIRCUIT**<br>• Disconnect AWD CM connector.<br>• Inspect for continuity between AWD CM terminal O and AWD solenoid terminal B.<br>• Is there continuity? | Yes | Go to next step. |
| | | No | Repair or replace harness for open circuit between AWD CM and AWD solenoid, then go to Step 7. |
| 3 | **INSPECT AWD SOLENOID TO AWD CM (POWER SUPPLY CIRCUIT) FOR SHORT TO GROUND**<br>• Inspect for continuity between AWD CM terminal O and ground.<br>• Is there continuity? | Yes | Repair or replace harness for short to ground between AWD CM and AWD solenoid, then go to Step 7. |
| | | No | Go to next step. |
| 4 | **INSPECT AWD SOLENOID TO AWD CM (GROUND CIRCUIT) FOR OPEN CIRCUIT**<br>• Inspect for continuity between AWD CM terminal P and AWD solenoid terminal A.<br>• Is there continuity? | Yes | Go to next step. |
| | | No | Repair or replace harness for open circuit between AWD CM and AWD solenoid, then go to Step 7. |
| 5 | **INSPECT AWD SOLENOID TO AWD CM (GROUND CIRCUIT) FOR SHORT TO GROUND**<br>• Inspect for continuity between AWD CM terminal P and ground.<br>• Is there continuity? | Yes | Repair or replace harness for short to ground between AWD CM and AWD solenoid, then go to Step 7. |
| | | No | Go to next step. |
| 6 | **INSPECT AWD CM POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Measure voltage between AWD CM terminal K and ground.<br>• Is voltage B+? | Yes | Replace AWD CM, then go to Step 7. |
| | | No | Repair or replace harness for open circuit between AWD CM and AWD solenoid, then go to next step. |
| 7 | **INSPECT FUSE CONDITION**<br>• Turn ignition key to OFF.<br>• Is ENG B+ (25A) fuse okay? | Yes | Go to next step. |
| | | No | Replace fuse, then go to Step 9. |
| 8 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear DTC from memory. (See 03-02-2 ELECTRONIC AWD CONTROL SYSTEM ON-BOARD DIAGNOSIS)<br>• Drive vehicle.<br>• Is the same DTC present? | Yes | Replace AWD CM, then go to next step. |
| | | No | Go to next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Is there any other DTC present? | Yes | Go to applicable DTC inspection. |
| | | No | Troubleshooting completed. |

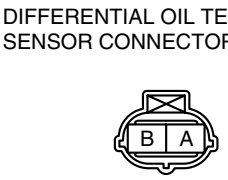
## DTC P1888

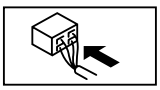
id030200800400

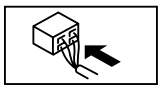
| DTC P1888 | Differential oil temperature sensor circuit |
|---|---|
| DETECTION CONDITION | • Differential oil temperature sensor voltage monitor circuit detects abnormal input voltage. |
| POSSIBLE CAUSE | • Open circuit, or short to battery or GND between AWD CM terminal A and differential oil temperature sensor terminal A<br>• Open circuit or short to battery between AWD CM terminal C and differential oil temperature sensor terminal B<br>• Differential oil temperature sensor malfunction<br>• AWD CM malfunction<br>• Poor connection of connectors (female terminals) |





**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DIFFERENTIAL OIL TEMPERATURE SENSOR CONDITION**<br>• Turn ignition key to OFF.<br>• Disconnect differential oil temperature sensor connector.<br>• Is it okay? | Yes | Go to next step. |
| | | No | Replace differential oil temperature sensor, then go to Step 7. |
| 2 | **INSPECT AWD CM TO DIFFERENTIAL OIL TEMPERATURE SENSOR FOR OPEN CIRCUIT**<br>• Disconnect AWD CM connector.<br>• Inspect for continuity between AWD CM terminal A and differential oil temperature sensor terminal A.<br>• Is there continuity? | Yes | Go to next step. |
| | | No | Repair or replace harness for open circuit between AWD CM and differential oil temperature sensor, then go to Step 7. |
| 3 | **INSPECT AWD CM TO DIFFERENTIAL OIL TEMPERATURE SENSOR FOR SHORT TO POWER**<br>• Inspect voltage between AWD CM terminal A and ground.<br>• Is voltage B+? | Yes | Repair or replace harness for short to power between AWD CM and differential oil temperature sensor, then go to Step 7. |
| | | No | Go to next step. |
| 4 | **INSPECT AWD CM TO DIFFERENTIAL OIL TEMPERATURE SENSOR FOR SHORT TO GROUND**<br>• Inspect for continuity between AWD CM terminal A and ground.<br>• Is there continuity? | Yes | Repair or replace harness for short to ground between AWD CM and differential oil temperature sensor, then go to Step 7. |
| | | No | Go to next step. |
| 5 | **INSPECT AWD CM TO DIFFERENTIAL OIL TEMPERATURE SENSOR FOR OPEN CIRCUIT**<br>• Inspect for continuity between AWD CM terminal C and differential oil temperature sensor terminal B.<br>• Is there continuity? | Yes | Go to next step. |
| | | No | Repair or replace harness for open circuit between AWD CM and differential oil temperature sensor, then go to Step 7. |
| 6 | **INSPECT AWD CM TO DIFFERENTIAL OIL TEMPERATURE SENSOR FOR SHORT TO GROUND**<br>• Inspect voltage between AWD CM terminal C and ground.<br>• Is voltage B+? | Yes | Repair or replace harness for short to power between AWD CM and differential oil temperature sensor, then go to next step. |
| | | No | Replace AWD CM, then go to next step. |
| 7 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear DTC from memory. (See 03-02-2 ELECTRONIC AWD CONTROL SYSTEM ON-BOARD DIAGNOSIS)<br>• Drive vehicle.<br>• Is the same DTC present? | Yes | Replace AWD CM, then go to next step. |
| | | No | Go to next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Is there any other DTC present? | Yes | Go to applicable DTC inspection. |
| | | No | Troubleshooting completed. |

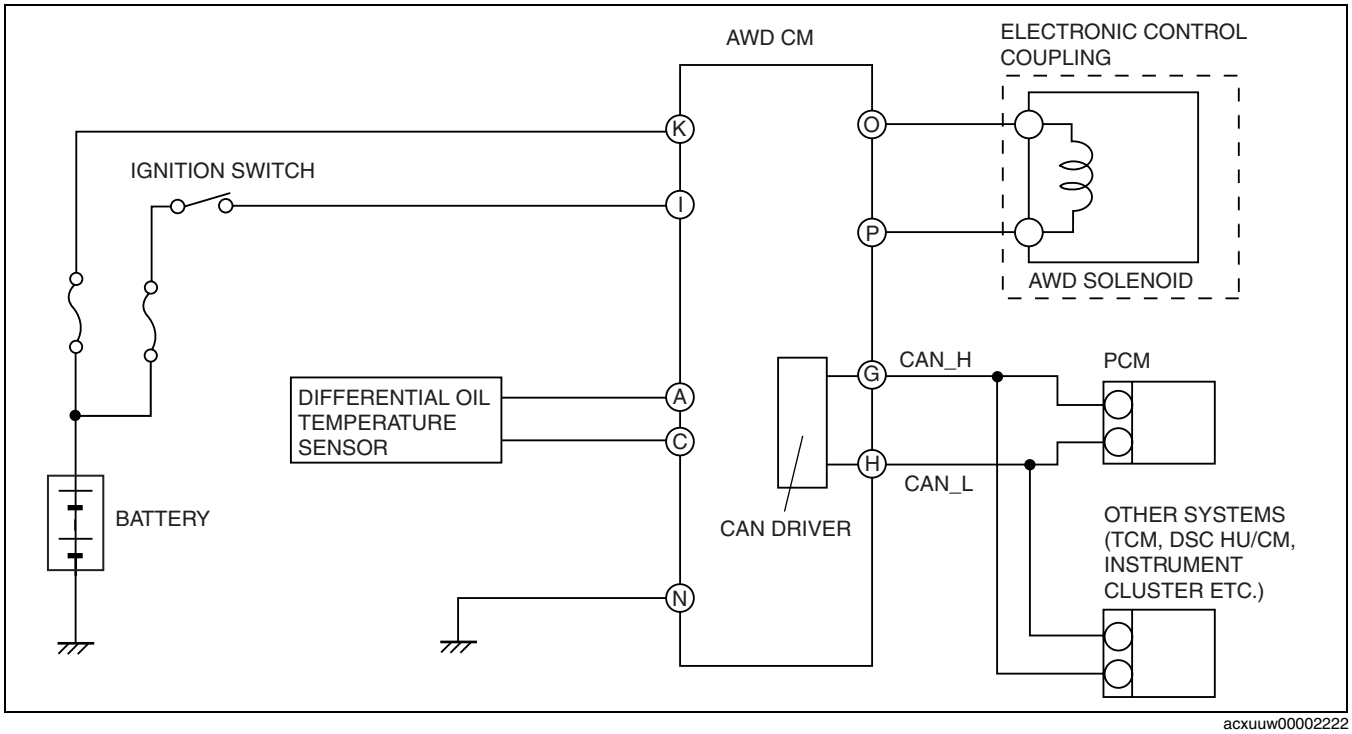
# 03-03 SYMPTOM TROUBLESHOOTING

ELECTRONIC AWD CONTROL SYSTEM WIRING DIAGRAM . . . . . 03-03–1
FOREWORD . . . . . 03-03–2
SYMPTOM TROUBLESHOOTING . . . . . 03-03–2
NO.1 FREQUENT FRONT WHEEL SLIP . . . . . 03-03–3
NO.2 TIGHT CORNER BRAKING . . . . . 03-03–4
NO.3 ABNORMAL NOISE AND/OR VIBRATION FROM COUPLING COMPONENT . . . . . 03-03–5

## ELECTRONIC AWD CONTROL SYSTEM WIRING DIAGRAM

id030300800100



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## FOREWORD

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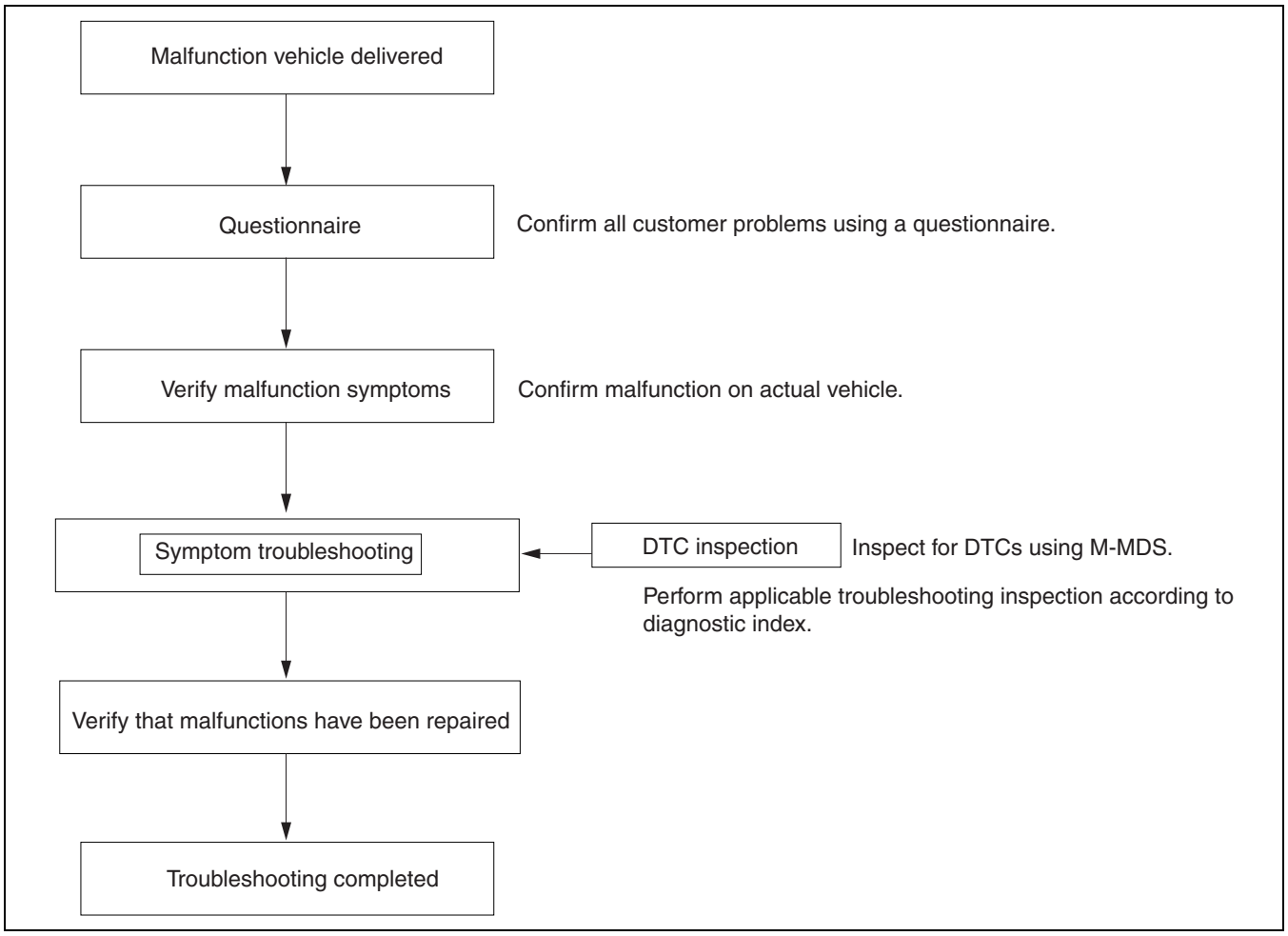


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## SYMPTOM TROUBLESHOOTING

id030300800300

- Verify the symptoms, and perform troubleshooting according to the appropriate number.

| No. | Symptom | Description |
|---|---|---|
| 1 | Frequent front wheel slip | Front wheels slip frequently during acceleration on low-friction road. |
| 2 | Tight corner braking effect | Brakes seem to be applied during tight cornering while driving very slowly on paved road. |
| 3 | Abnormal noise and/or vibration from coupling unit | There is abnormal noise and/or vibration from coupling unit during driving. |

## NO.1 FREQUENT FRONT WHEEL SLIP

id030300800400

| 1 | Frequent front wheel slip |
|---|---|

**[TROUBLESHOOTING HINTS]**

- **Tire traction performance is extremely poor for given road friction. (AWD system is normal.)**
- **Improper wheel alignment (AWD system is normal.)**
- **Rear differential oil temperature is extremely high (Fail-safe condition)**
- **Differential oil temperature sensor malfunction (Fail-safe condition)**
- **Compare slip frequency with another vehicle of the same model (under the same road conditions and tire traction performance).**
- **Replace tires with others of the same model and perform test under the same road conditions to determine if the malfunction was caused by tire traction performance.**
- **Coupling component malfunction**
- **AWD solenoid malfunction**



**Warning**

- **During simulation driving, vehicle stability may decrease extremely and cause an accident. Be sure to perform the simulation test driving in a safe area.**

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DSC, PCM, AND AWD SYSTEM DTCs**<br>• Verify DSC, PCM, and AWD system DTCs using the M-MDS.<br>• Are there any DTCs present? | Yes | Go to applicable DTC inspection. |
| | | No | Go to next step. |
| 2 | **VERIFY TIRE AIR PRESSURE**<br>• Inspect tire air pressure.<br>• Is it within specification? | Yes | Go to next step. |
| | | No | Adjust tire air pressure, then go to next step. |
| 3 | **COMPARE WITH SAME MODEL TIRES**<br>• Install tires of the same model.<br>• Perform simulation driving.<br>• Does malfunction recur? | Yes | Go to next step. |
| | | No | AWD system is okay. |
| 4 | **COMPARE WITH SAME MODEL VEHICLE**<br>• Install tires of malfunctioning vehicle to another same model vehicle.<br>• Perform simulation driving.<br>• Does malfunction recur? | Yes | AWD system is okay. |
| | | No | Go to next step. |
| 5 | **INSPECT AWD SOLENOID**<br>• Inspect AWD solenoid. (See 03-19-11 AWD SOLENOID INSPECTION)<br>• Is coupling component solenoid okay? | Yes | Inspect harness between AWD solenoid and AWD CM, then go to next step. |
| | | No | Replace coupling component. (See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION.) |
| 6 | **INSPECT WHEEL ALIGNMENT**<br>• Inspect wheel alignment.<br>• Is it okay? | Yes | Replace coupling component. (See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION.) |
| | | No | Inspect wheel alignment, and adjust it if necessary. |

## NO.2 TIGHT CORNER BRAKING

id030300800500

| 2 | Tight corner braking |
|---|---|

**[TROUBLESHOOTING HINTS]**

- **Because the coupling component locks up easily (similar to direct AWD), rotational difference between the front and rear wheels cannot be absorbed and brake-like phenomenon occurs.**
- **Due to the coupling component construction, slight tight corner braking effect occurs during tight cornering on a paved road. (AWD system is okay. Compare with another same model vehicle to determine malfunction.)**
- **Coupling component malfunction**
- **AWD solenoid malfunction**

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DSC, PCM, AND AWD SYSTEM DTCS**<br>• Verify DSC, PCM, and AWD system DTCs using the M-MDS.<br>• Are there any DTCs present? | Yes | Go to applicable DTC inspection. |
| | | No | Go to next step. |
| 2 | **VERIFY TIRE AIR PRESSURE**<br>• Inspect tire air pressure.<br>• Is it within specification? | Yes | Go to next step. |
| | | No | Adjust tire air pressure, then go to next step. |
| 3 | **INSPECT ABS WHEEL-SPEED SENSOR**<br>• Inspect ABS wheel-speed sensor.<br>• Is it okay? | Yes | Go to next step. |
| | | No | Repair or replace malfunctioning part. |
| 4 | **COMPARE WITH SAME MODEL VEHICLE**<br>• Perform simulation driving with another same model vehicle.<br>• Does malfunction recur on the same model vehicle? | Yes | AWD system is okay. |
| | | No | Go to next step. |
| 5 | **PERFORM SIMULATION DRIVING WITH AWD SOLENOID CONNECTOR DISCONNECTED**<br>• Turn ignition key OFF.<br>• Disconnect AWD solenoid connector.<br>• Perform simulation driving. (Clear DTC after simulation driving.)<br>• Does malfunction recur? | Yes | Replace coupling component. (See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION.) |
| | | No | Go to next step. |
| 6 | **INSPECT AWD SOLENOID**<br>• Inspect AWD solenoid. (See 03-19-11 AWD SOLENOID INSPECTION)<br>• Is it okay? | Yes | Inspect harness between AWD solenoid and AWD CM, then go to next step. |
| | | No | Replace coupling component. (See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION.) |

## NO.3 ABNORMAL NOISE AND/OR VIBRATION FROM COUPLING COMPONENT

id030300800600

| 3 | Abnormal noise and/or vibration from coupling component |
|---|---|

**[TROUBLESHOOTING HINTS]**
- Abnormal noise and/or vibration from coupling component during driving
- Propeller shaft is malfunctioning or attached improperly.
- Engine mount or differential mount malfunction
- Resonance of rotating parts on vehicle (engine, propeller shaft, rear differential, tire, etc.)
- Resonance with engine vibration (mainly with exhaust system parts)
- Rear differential malfunction
- Coupling component malfunction

### Diagnostic procedure



| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DSC, PCM, AND AWD SYSTEM DTCS**<br>• Verify DSC, PCM, and AWD system DTCs using the M-MDS.<br>• Are there any DTCs present? | Yes | Go to applicable DTC inspection. |
| | | No | Go to next step. |
| 2 | **VERIFY INSTALLATION CONDITION OF VEHICLE PARTS**<br>• Verify installation condition for following:<br>— Propeller shaft (including bending and joint operation)<br>— Center bearing<br>— Engine mount<br>— Differential mount<br>— Hub bearing<br>— Exhaust system parts<br>— ABS wheel-speed sensor<br>• Are they properly installed? | Yes | Go to next step. |
| | | No | Repair or replace malfunctioning part. |
| 3 | **DETERMINE IF MALFUNCTION IS CAUSED BY REAR DIFFERENTIAL**<br>• Install tires of another brand.<br>**Note**<br>• When tires of another brand are installed, the same malfunction can occur due to conditions different from customer explanation. Be careful not to confuse it with customer complaint.<br>• Perform simulation driving at the same engine speed, gear position, and vehicle speed that customer vehicle had malfunction.<br>• Does the same malfunction occur? | Yes | Reinstall customer's vehicle tire. Go to next step. |
| | | No | AWD system is okay.<br>Reinstall customer's vehicle tire. |
| 4 | **INSPECT REAR DIFFERENTIAL**<br>• Inspect rear differential for following:<br>— Backlash<br>— Teeth contact<br>(See 03-14-10 REAR DIFFERENTIAL ASSEMBLY)<br>• Are they okay? | Yes | Replace coupling component. |
| | | No | Inspect malfunctioning part and adjust it if necessary. |

# 03-10 GENERAL PROCEDURES

**GENERAL PROCEDURES (FRONT AND REAR AXLES) . . . . . 03-10–1**
Wheel and Tire Installation . . . . . **03-10–1**
Suspension Links Removal/Installation . . . . . **03-10–1**
Connector Disconnection . . . . . **03-10–1**
Electronic AWD Control System Parts . . . . . **03-10–1**

## GENERAL PROCEDURES (FRONT AND REAR AXLES)

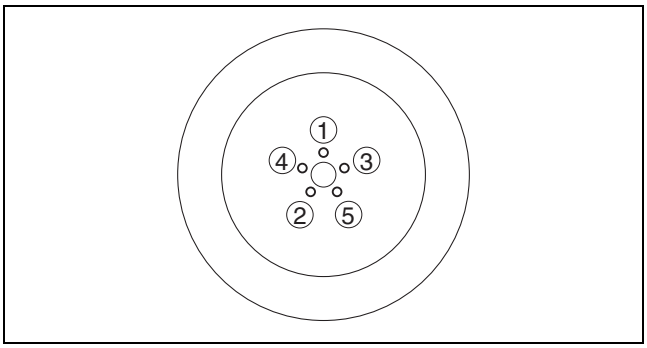
id031000800100



### Wheel and Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   **Tightening torque**
   **88.2— 117.6 N·m {9.00— 11.99 kgf·m, 65.06— 86.73 ft·lbf}**

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### Suspension Links Removal/Installation

1. For the joint sections with rubber bushings, raise the vehicle using a lift, and then temporarily tighten the installation bolts and nuts. Lower the vehicle to the ground and tighten them completely with the specified torque.

### Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)

### Electronic AWD Control System Parts

1. After servicing the electronic AWD control system parts, verify that no DTC has been stored. Clear any DTCs remaining in the memory.

# 03-11 FRONT AXLE

**FRONT AXLE LOCATION INDEX. . . . . 03-11–1**
**FRONT WHEEL HUB BOLT REPLACEMENT. . . . . 03-11–2**
**WHEEL HUB, STEERING KNUCKLE INSPECTION. . . . . 03-11–2**
Wheel Bearing Excessive Play Inspection. . . . . **03-11–2**
**WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION. . . . . 03-11–3**
Locknut Removal Note. . . . . **03-11–4**
Brake Caliper Removal Note. . . . . **03-11–4**
Wheel Hub Removal Note. . . . . **03-11–5**
Wheel Bearing Removal Note. . . . . **03-11–5**
Dust Cover Removal Note. . . . . **03-11–5**
Wheel Hub Bolt Removal Note . . . . . **03-11–6**
Wheel Hub Bolt Installation Note . . . . . **03-11–6**
Dust Cover Installation Note . . . . . **03-11–6**
Wheel Bearing Installation Note . . . . . **03-11–7**
Wheel Hub Installation Note . . . . . **03-11–7**
Locknut Installation Note. . . . . **03-11–7**



## FRONT AXLE LOCATION INDEX

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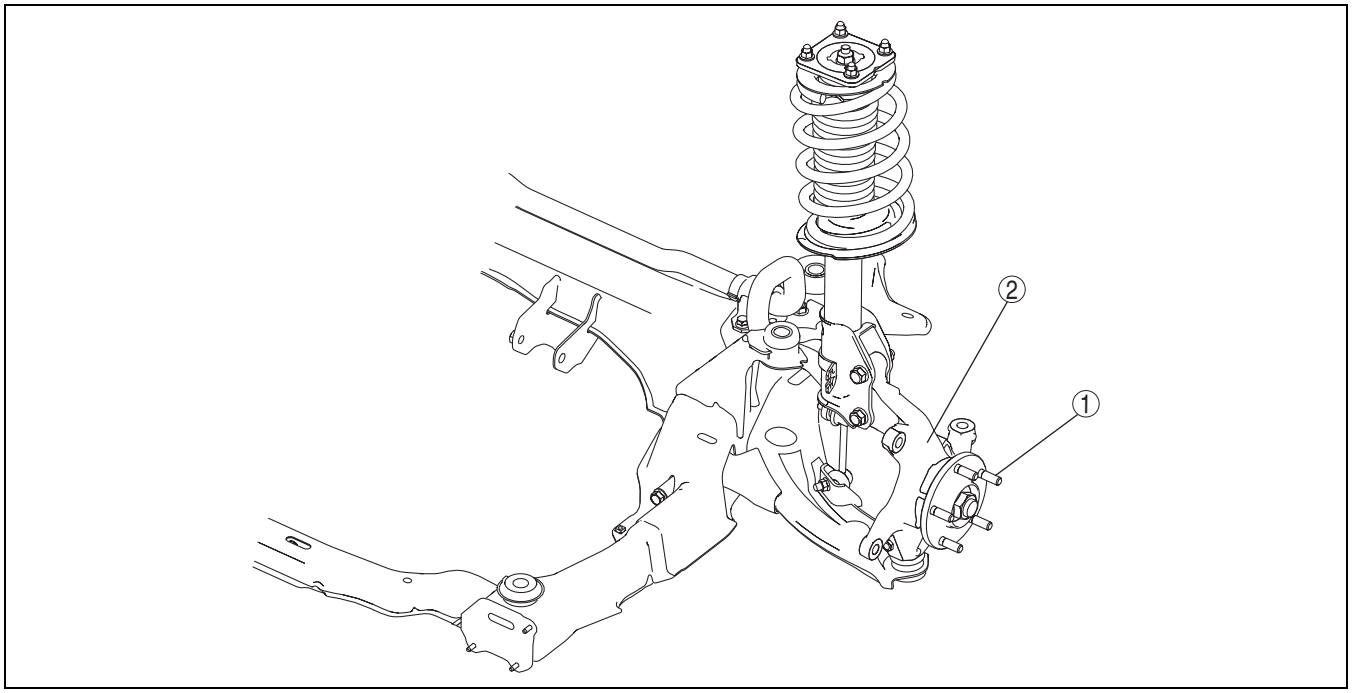


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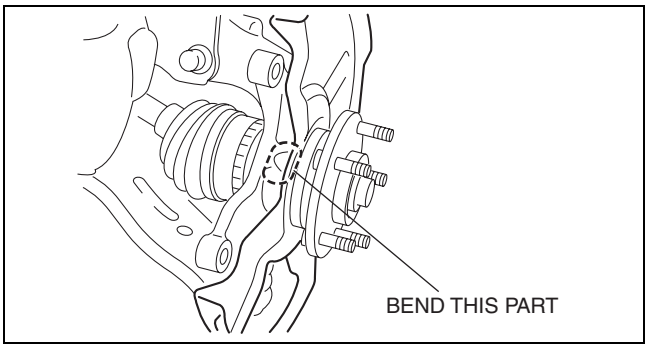
| | |
|---|---|
| 1 | Wheel hub bolt<br>(See 03-11-2 FRONT WHEEL HUB BOLT REPLACEMENT.) |

| | |
|---|---|
| 2 | Wheel hub, steering knuckle<br>(See 03-11-2 WHEEL HUB, STEERING KNUCKLE INSPECTION.)<br>(See 03-11-3 WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION.) |

## FRONT WHEEL HUB BOLT REPLACEMENT

id031100800200

1. Remove the brake calliper component from the steering knuckle and suspend it out of the way using a cable.
2. Remove the disc plate.
3. Tap the dust cover (the part shown in the figure) with a chisel lightly and bend the processing point back to the steering knuckle side.

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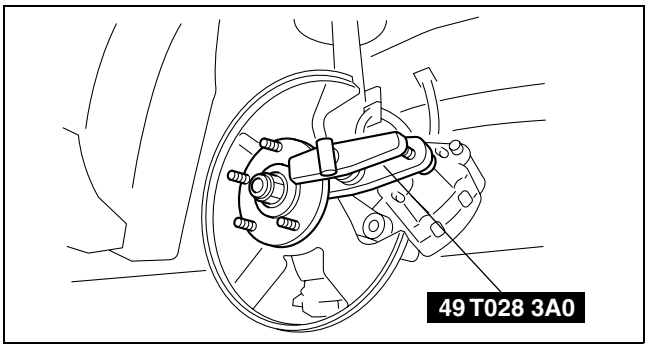
4. Remove the wheel hub bolt using the **SST** as shown in the figure.
5. Place a new wheel hub bolt in the wheel hub.

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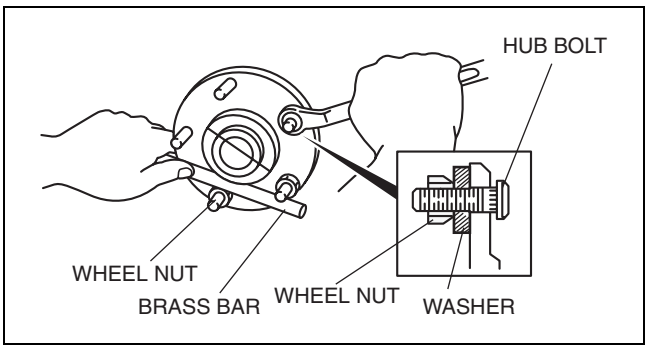
6. Install the wheel hub by placing a proper sized washer on the hub, and tightening the nut as shown in the figure.

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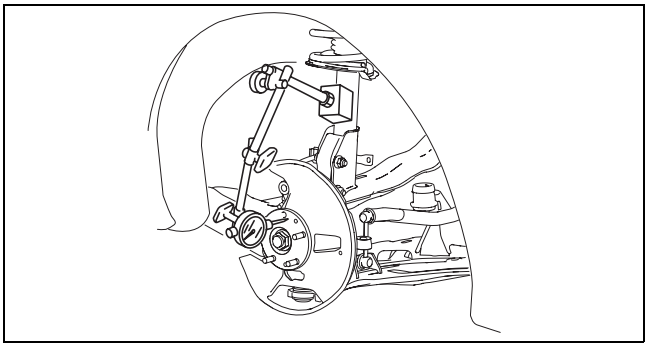
## WHEEL HUB, STEERING KNUCKLE INSPECTION

id031100800300

### Wheel Bearing Excessive Play Inspection

1. Install the magnetic base and dial gauge as shown in the figure and measure the wheel bearing axial excessive play.
   - If it exceeds the maximum specification, replace the wheel hub bearing.

   **Front wheel bearing maximum play**
   **0.05 mm {0.002 in}**



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## WHEEL HUB, STEERING KNUCKLE REMOVAL/INSTALLATION

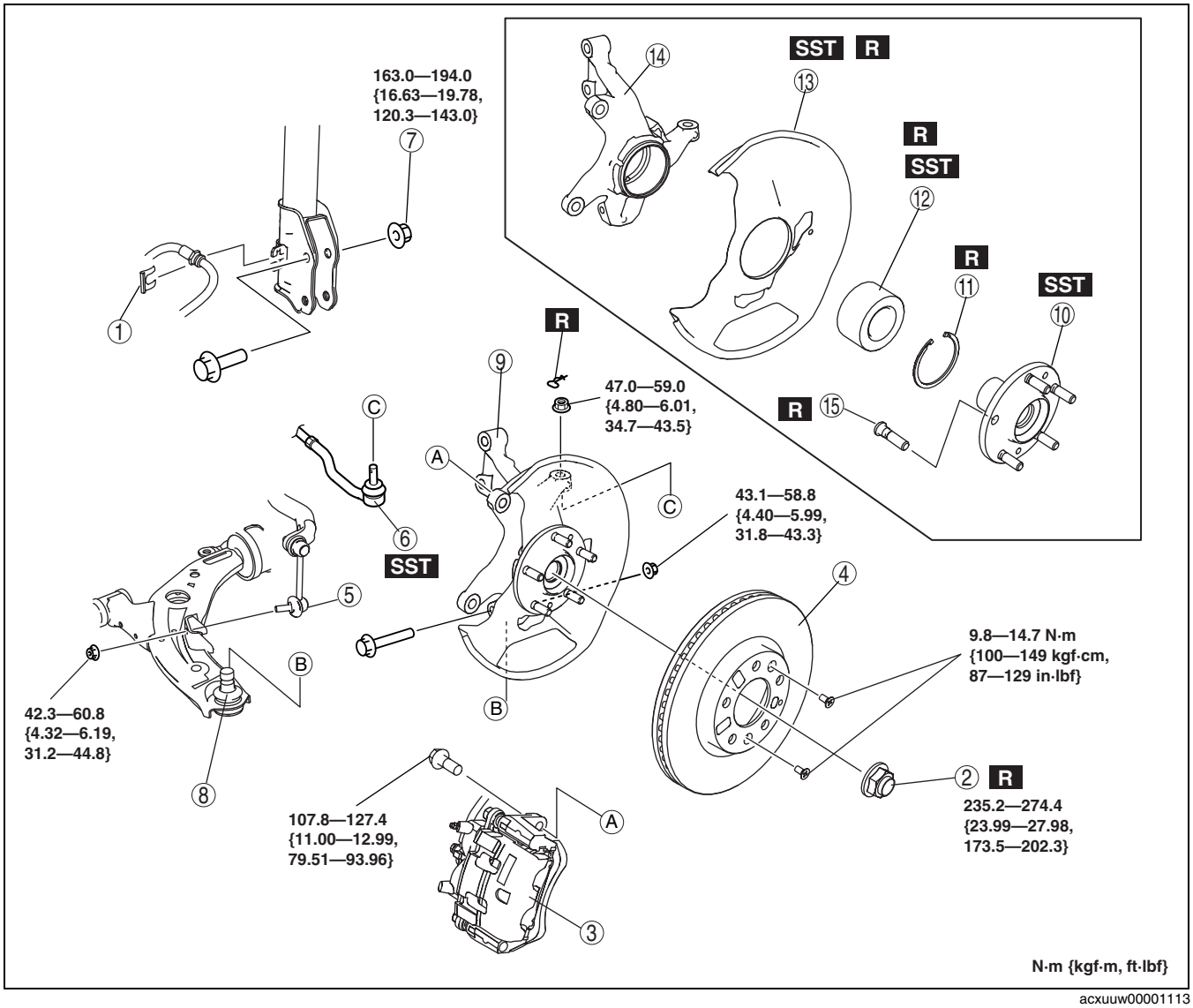
id031100800400

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, disconnect the ABS wheel-speed sensor connector (axle side) and fix the wiring harness to an appropriate place where it will not be pulled by mistake while servicing the vehicle.**

1. Remove the front ABS wheel-speed sensor. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, inspect the front wheel alignment and adjust it if necessary. (See 02-11-2 FRONT WHEEL ALIGNMENT.)



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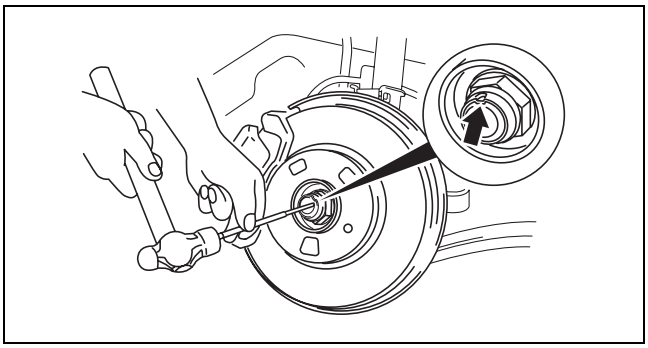
| | |
|---|---|
| 1 | Brake hose clip |
| 2 | Locknut<br>(See 03-11-4 Locknut Removal Note.)<br>(See 03-11-7 Locknut Installation Note.) |
| 3 | Brake caliper component<br>(See 03-11-4 Brake Caliper Removal Note.) |
| 4 | Disc plate |
| 5 | Stabilizer control link (lower side) |

| | |
|---|---|
| 6 | Tie-rod end ball joint<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.) |
| 7 | Nut (front shock absorber lower side) |
| 8 | Front lower arm ball joint |
| 9 | Wheel hub, steering knuckle component |
| 10 | Wheel hub<br>(See 03-11-5 Wheel Hub Removal Note.)<br>(See 03-11-7 Wheel Hub Installation Note.) |

| | |
|---|---|
| 11 | Retaining ring |
| 12 | Wheel bearing<br>(See 03-11-5 Wheel Bearing Removal Note.)<br>(See 03-11-7 Wheel Bearing Installation Note.) |
| 13 | Dust cover<br>(See 03-11-5 Dust Cover Removal Note.)<br>(See 03-11-6 Dust Cover Installation Note.) |
| 14 | Steering knuckle |
| 15 | Wheel hub bolt<br>(See 03-11-6 Wheel Hub Bolt Removal Note.)<br>(See 03-11-6 Wheel Hub Bolt Installation Note.) |

**Locknut Removal Note**

1. Lock the hub by applying the brakes.
2. Knock the crimped portion of the locknut outward using a small chisel and a hammer.
3. Remove the locknut.
4. Install a spare nut onto the drive shaft so that the nut is flush with the end of the drive shaft.



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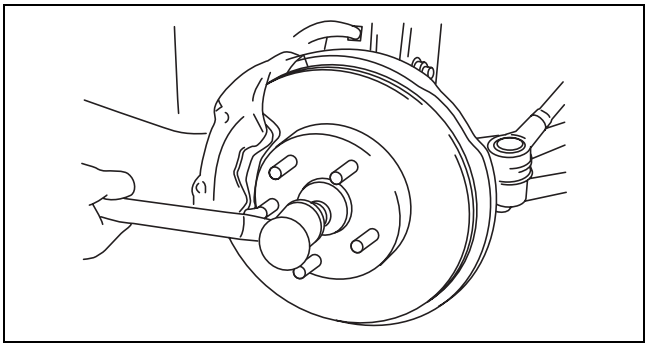
5. Tap the nut with a copper hammer to loosen the drive shaft from the front wheel hub.
6. Separate the drive shaft from the wheel hub.



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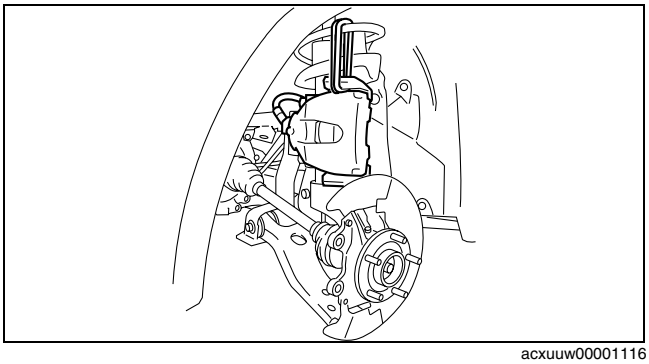
**Brake Caliper Removal Note**

1. Remove the brake caliper component from the steering knuckle and suspend it out of the way using a cable.



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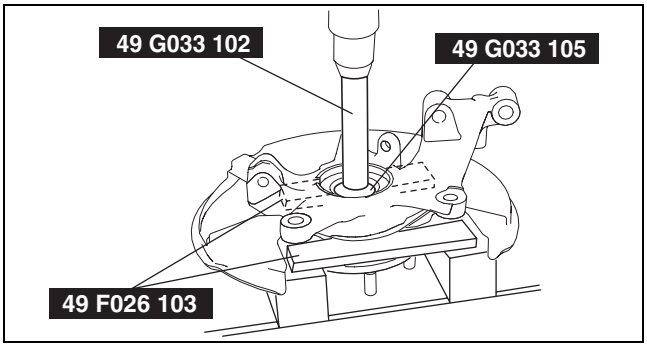
**Wheel Hub Removal Note**

1. Remove the wheel hub using the **SSTs**.
   **Substitution SST**
   - **49 G033 105**
     Outer diameter: 37— 43 mm {1.5— 1.6 in}



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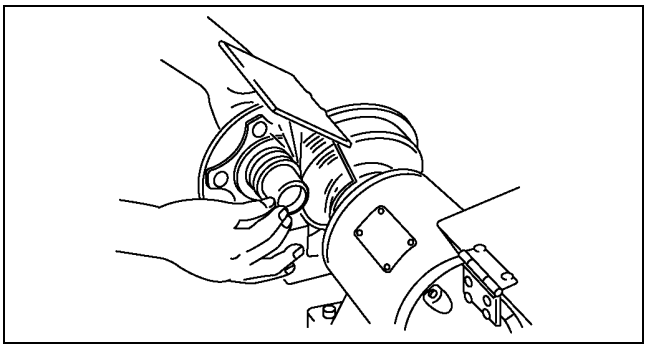
2. If the bearing inner race remains on the front wheel hub component, grind a section of the bearing inner race until **approx. 0.5 mm {0.02 in}** remains. Then remove it using a chisel.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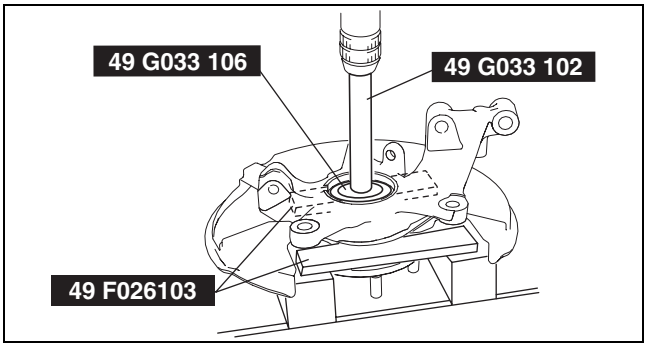
**Wheel Bearing Removal Note**

1. Remove the wheel bearing using the **SSTs**.
   **Substitution SST**
   - **49 G033 106**
     Outer diameter: 54— 63 mm {2.2— 2.4 in}



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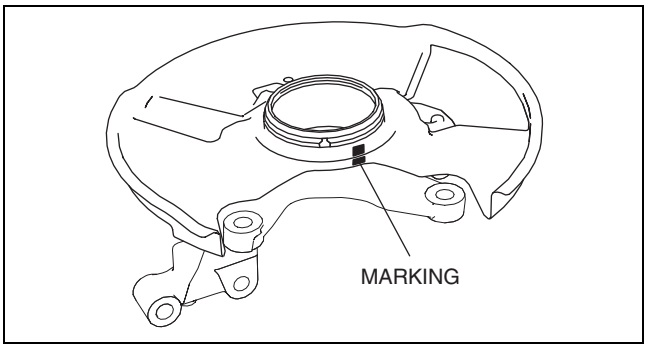
**Dust Cover Removal Note**

**Note**
- The dust cover does not need to be removed unless it is being replaced.

1. Mark the dust cover and steering knuckle for proper installation.



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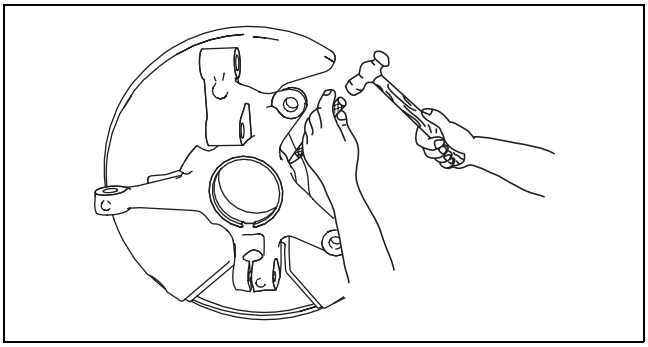
2. Remove the dust cover using a chisel.



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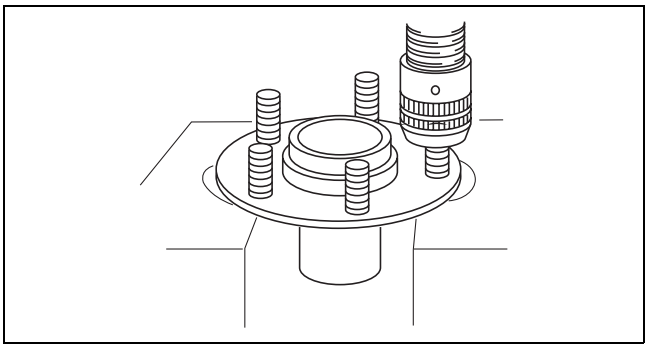
**Wheel Hub Bolt Removal Note**

**Note**
- The hub bolts do not need to be removed unless they are being replaced.

1. Remove the hub bolt using a press.



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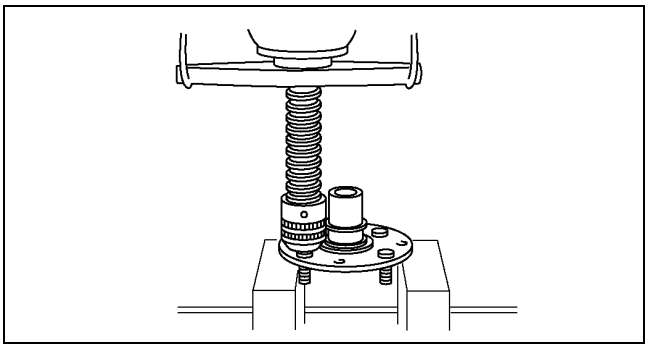
**Wheel Hub Bolt Installation Note**

1. Install the new hub bolt using a press.



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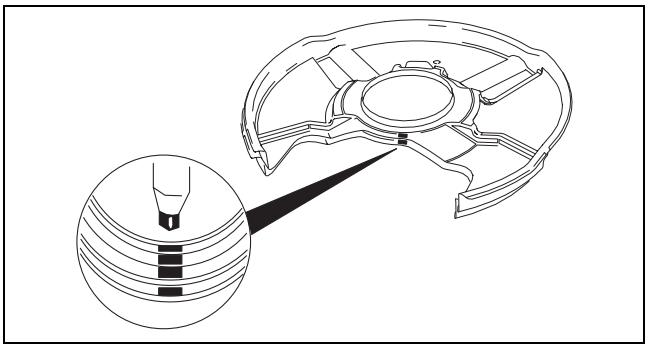
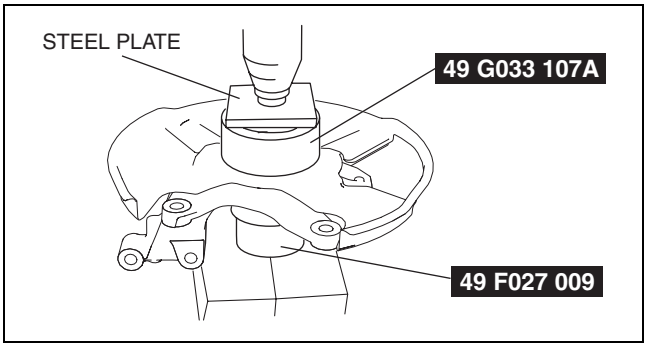
**Dust Cover Installation Note**

1. Mark the new dust cover in the same way as the removed one.
2. Align the marks of the new dust cover and the knuckle.



acxuuw00001124

3. Install the new dust cover using the **SSTs**.
   **Substitution SST**
   - **49 G033 107A**
     Inner diameter: 98— 108 mm {3.9— 4.2 in}
     Tube with board thickness 3 mm {0.2 in} or more
   - **49 F027 009**
     Outer diameter: 77— 82 mm {3.1— 3.2 in}



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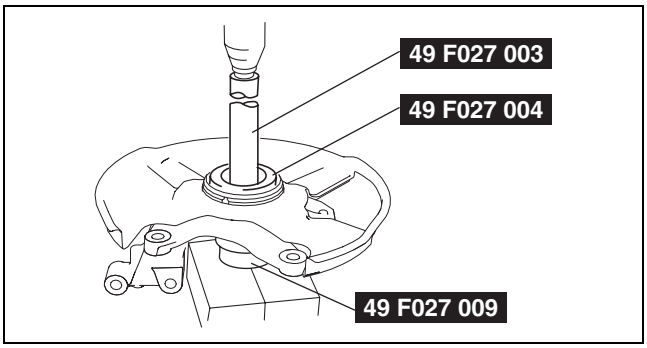
**Wheel Bearing Installation Note**

1. Install the new wheel bearing using the **SSTs**.
   **Substitution SST**
   - **49 F027 004**
     Outer diameter: 78— 83 mm {3.1— 3.2 in}
   - **49 F027 009**
     Outer diameter: 77— 82 mm {3.1— 3.2 in}



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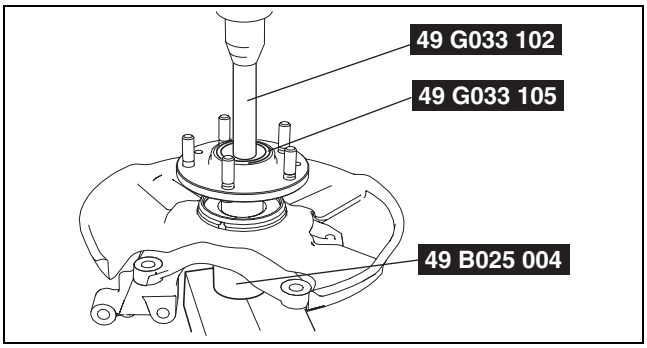
**Wheel Hub Installation Note**

1. Install the wheel hub using the **SSTs.**
   **Substitution SST**
   - **49 G033 105**
     Outer diameter: 39— 48 mm {1.6— 1.8 in}
   - **49 B025 004**
     Outer diameter: 54— 63 mm {2.2— 2.4 in}



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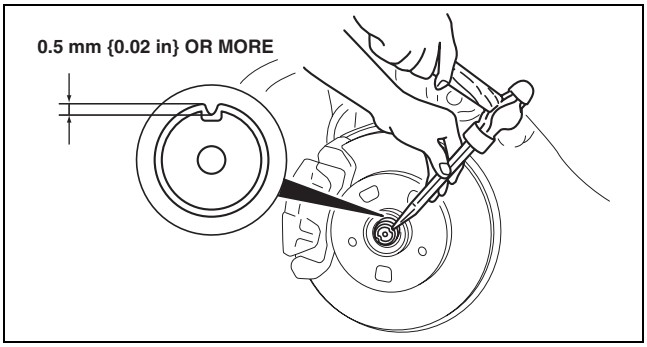
**Locknut Installation Note**

1. Install a new locknut and stake it as shown.



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# 03-12 REAR AXLE

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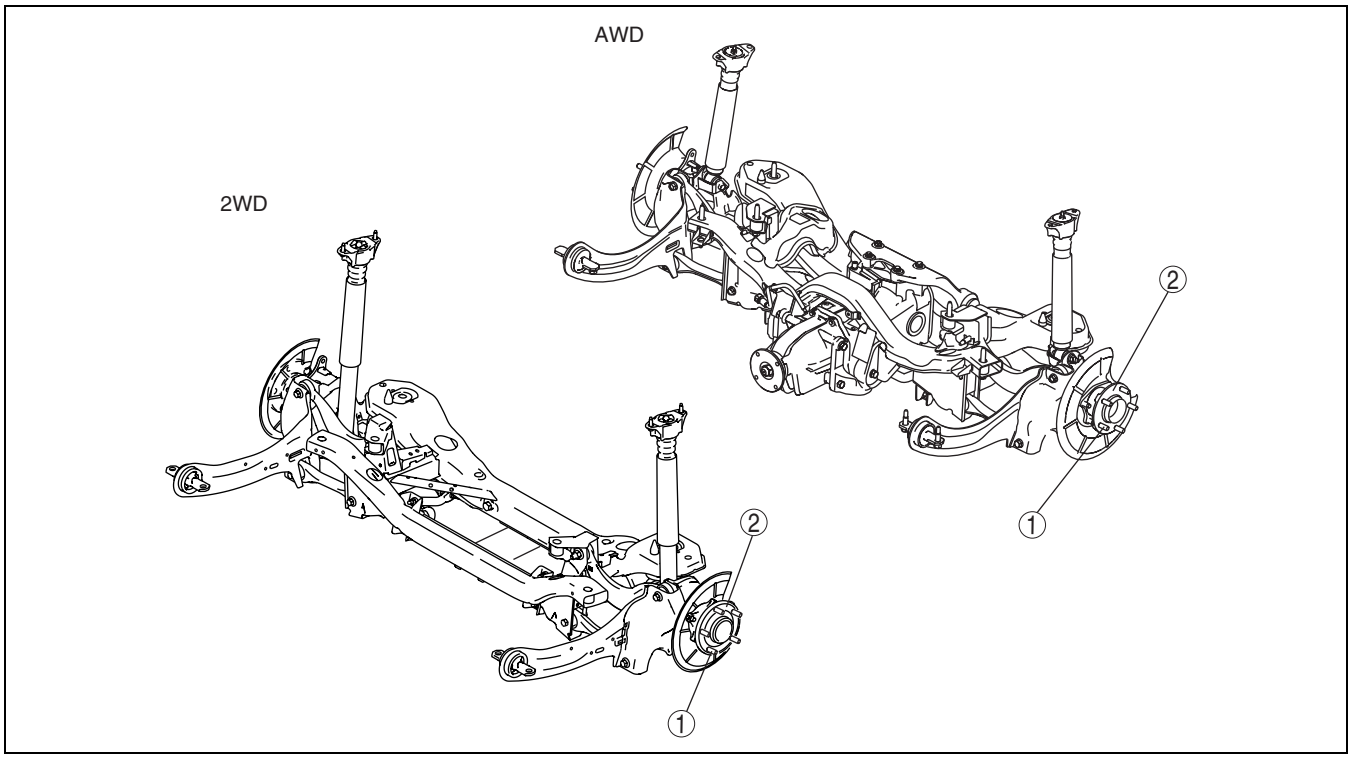
id031200800100

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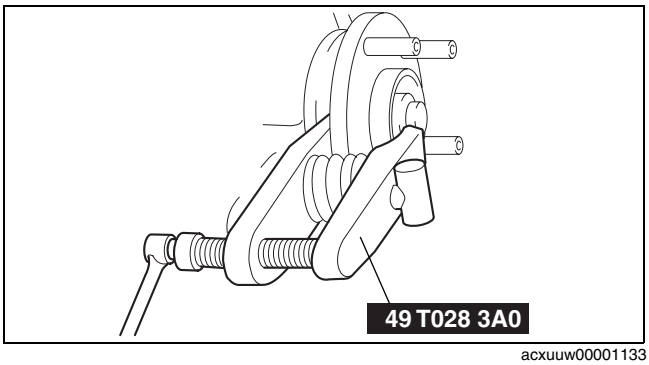
| | |
|---|---|
| 1 | Wheel hub bolt<br>(See 03-12-2 REAR WHEEL HUB BOLT REPLACEMENT.) |

| | |
|---|---|
| 2 | Wheel hub component<br>(See 03-12-2 WHEEL HUB COMPONENT INSPECTION.)<br>(See 03-12-3 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD].)<br>(See 03-12-5 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[AWD].) |

## REAR WHEEL HUB BOLT REPLACEMENT

id031200800200

1. Remove the brake calliper component and suspend it out of the way using a cable.
2. Remove the disc plate.
3. Remove the parking brake shoe.
4. Remove the wheel hub bolt using the **SST** as shown in the figure.
5. Place a new wheel hub bolt in the wheel hub.

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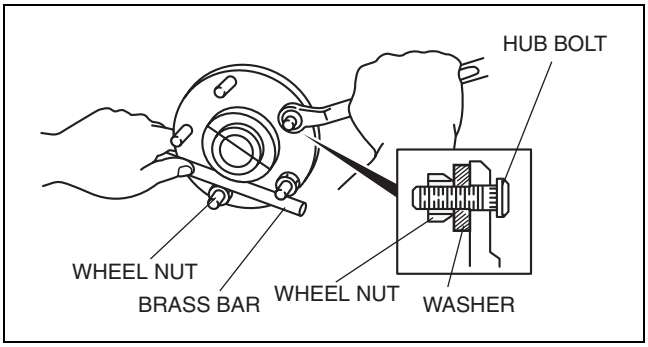
6. Install the wheel hub by placing a proper sized washer on the hub, and tightening the nut as shown in the figure.

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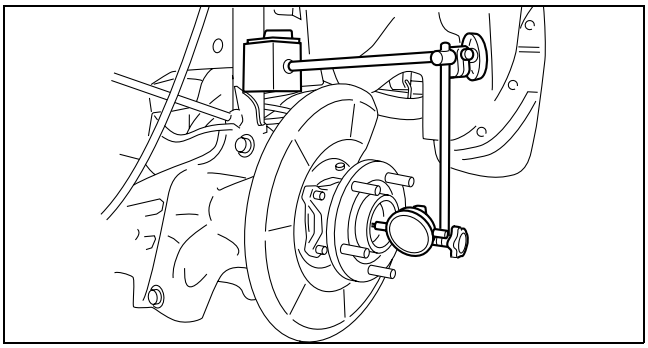
## WHEEL HUB COMPONENT INSPECTION

id031200800300

### Wheel Bearing Excessive Play Inspection

1. Install the magnetic base and dial gauge as shown in the figure and measure the wheel bearing axial excessive play.
   - If it exceeds the maximum specification, replace the wheel hub component.

   **Rear wheel bearing maximum play**
   **0.05 mm {0.002 in}**



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## WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD]

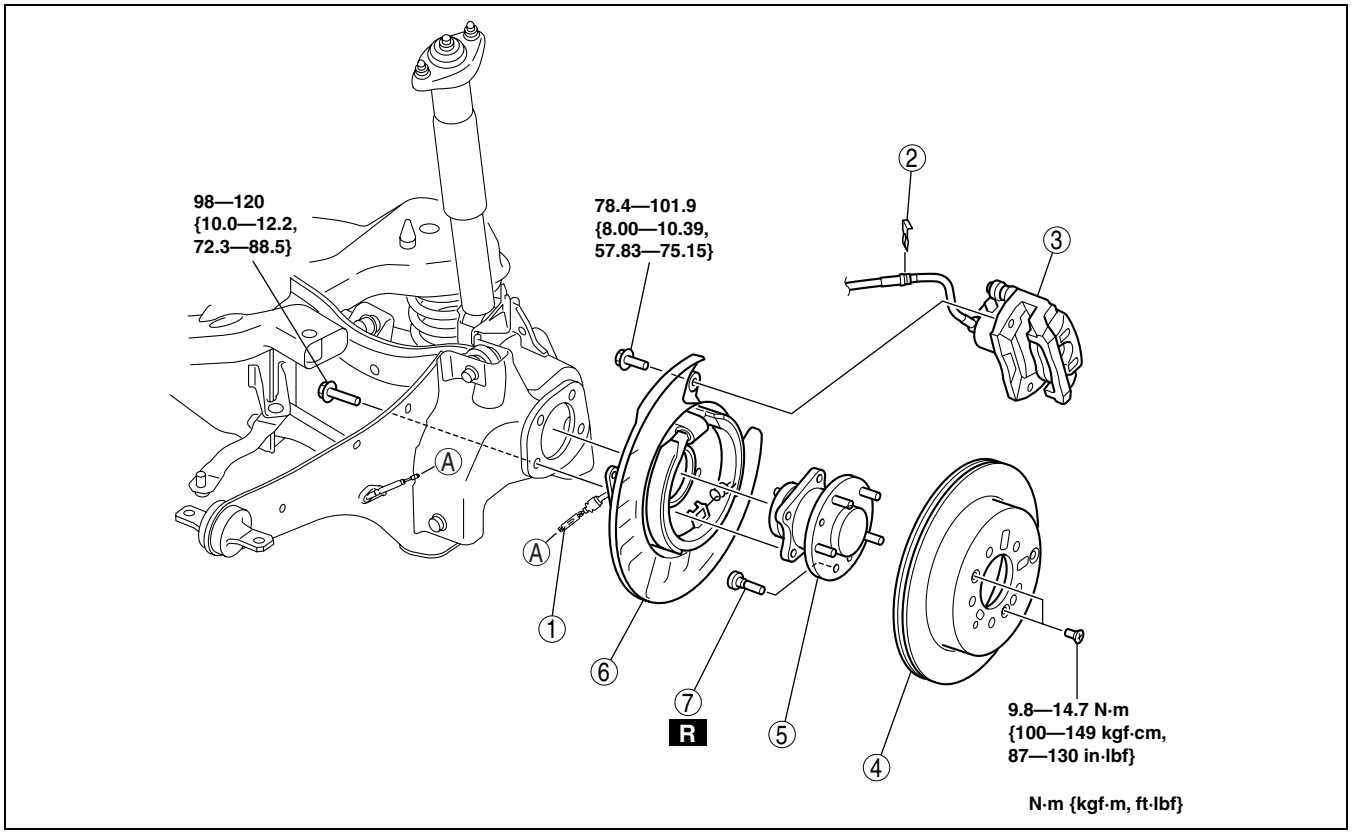
id0312008004a1

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, disconnect the ABS wheel-speed sensor connector (body side) and fix the wiring harness to an appropriate place where it will not be pulled by mistake while servicing the vehicle.**

1. Remove the rear ABS wheel-speed sensor. (See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.



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| | |
|---|---|
| 1 | Parking brake end cable<br>(See 04-12-3 PARKING BRAKE REMOVAL/INSTALLATION[2WD].) |
| 2 | Brake hose clip |
| 3 | Brake caliper component<br>(See 03-12-4 Brake Caliper Component Removal Note.) |

| | |
|---|---|
| 4 | Disc plate<br>(See 04-11-22 REAR BRAKE (DISC) REMOVAL/INSTALLATION |
| 5 | Wheel hub component |
| 6 | Parking brake component |
| 7 | Wheel hub bolt<br>(See 03-12-4 Wheel Hub Bolt Removal Note.)<br>(See 03-12-4 Wheel Hub Bolt Installation Note.) |

**Brake Caliper Component Removal Note**

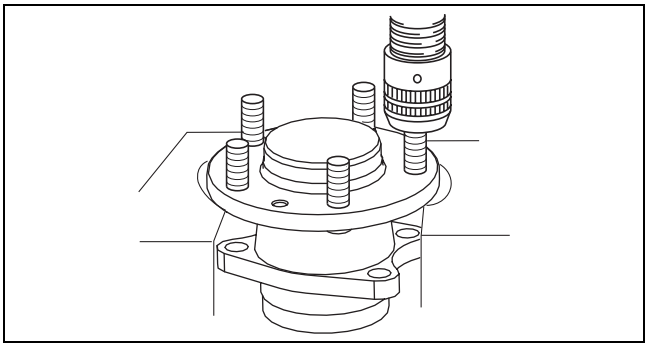
1. Remove the brake caliper component from the trailing link and suspend it out of the way using a cable.

**Wheel Hub Bolt Removal Note**

**Note**

- The wheel hub bolts do not need to be removed unless they are being replaced.

1. Remove the wheel hub bolt using a press.



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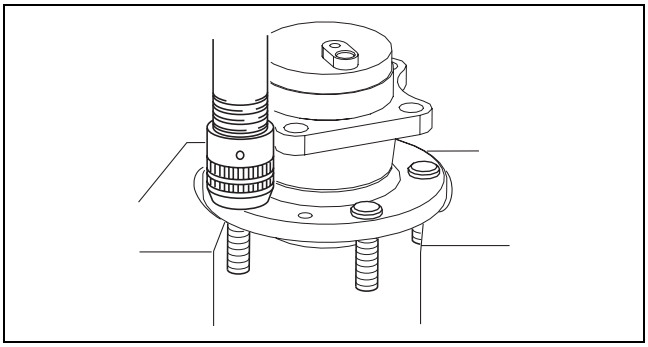
**Wheel Hub Bolt Installation Note**

1. Install the new wheel hub bolt using a press.



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## WHEEL HUB COMPONENT REMOVAL/INSTALLATION[AWD]

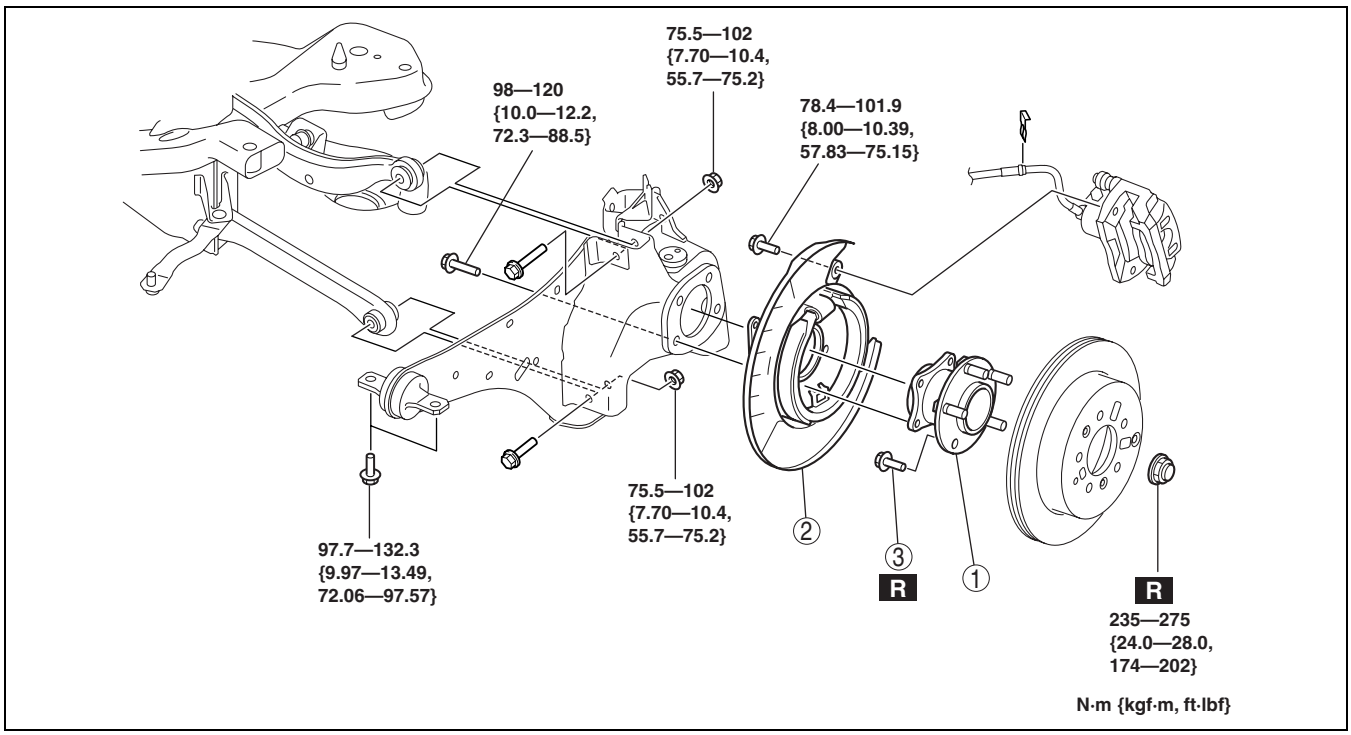
id0312008004a3

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, disconnect the ABS wheel-speed sensor connector (body side) and fix the wiring harness to an appropriate place where it will not be pulled by mistake while servicing the vehicle.**

1. Remove the rear ABS wheel-speed sensor. (See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].)
2. Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)
3. Remove the rear coil spring. (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.)
4. Remove the trailing link. (See 02-14-15 TRAILING LINK REMOVAL/INSTALLATION[AWD].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.



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| | |
|---|---|
| 1 | Wheel hub component |
| 2 | Parking brake shoe component |

| | |
|---|---|
| 3 | Wheel hub bolt<br>(See 03-12-3 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD].) |

# 03-13 DRIVE SHAFT

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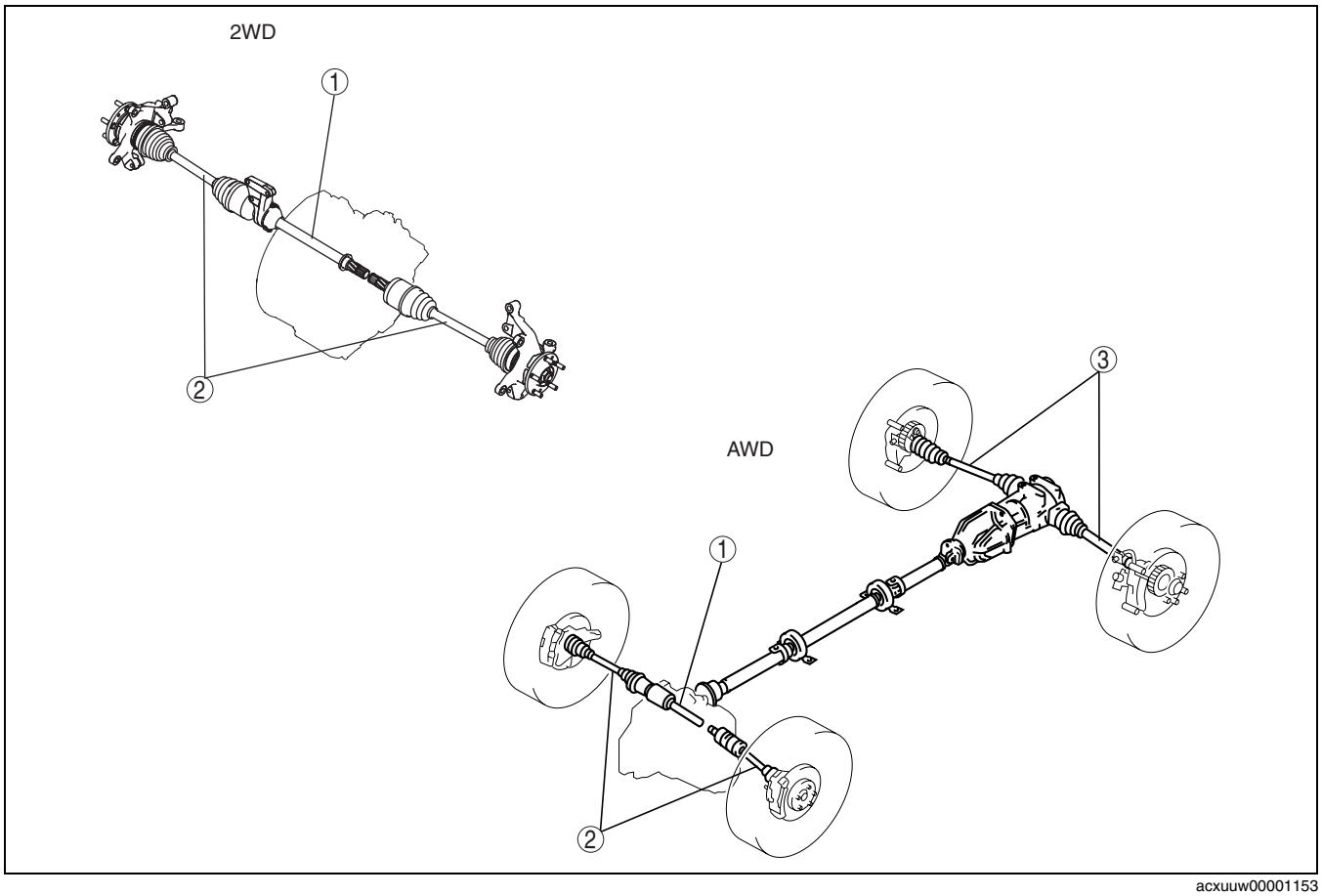


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| | |
|---|---|
| 1 | Joint shaft<br>(See 03-13-2 JOINT SHAFT PRE-INSPECTION[2WD])<br>(See 03-13-3 JOINT SHAFT REMOVAL/INSTALLATION[2WD])<br>(See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD])<br>(See 03-13-6 JOINT SHAFT DISASSEMBLY[2WD])<br>(See 03-13-7 JOINT SHAFT DISASSEMBLY[AWD])<br>(See 03-13-8 JOINT SHAFT ASSEMBLY[2WD])<br>(See 03-13-10 JOINT SHAFT ASSEMBLY[AWD]) |

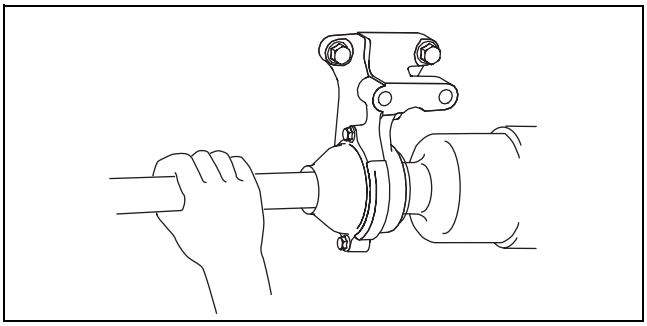
| | |
|---|---|
| 2 | Front drive shaft<br>(See 03-13-11 FRONT DRIVE SHAFT PRE-INSPECTION)<br>(See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION)<br>(See 03-13-15 FRONT DRIVE SHAFT DISASSEMBLY/ASSEMBLY) |
| 3 | Rear drive shaft (AWD)<br>(See 03-13-19 REAR DRIVE SHAFT PRE-INSPECTION)<br>(See 03-13-20 REAR DRIVE SHAFT REMOVAL/INSTALLATION)<br>(See 03-13-21 REAR DRIVE SHAFT DISASSEMBLY/ASSEMBLY) |

## JOINT SHAFT PRE-INSPECTION[2WD]

id0313008008a3

1. Verify that the joint shaft is not twisted or cracked.
   - Replace it as necessary.

2. Turn the joint shaft by hand and verify that the bearing rotates smoothly and freely.
   - Replace it as necessary.



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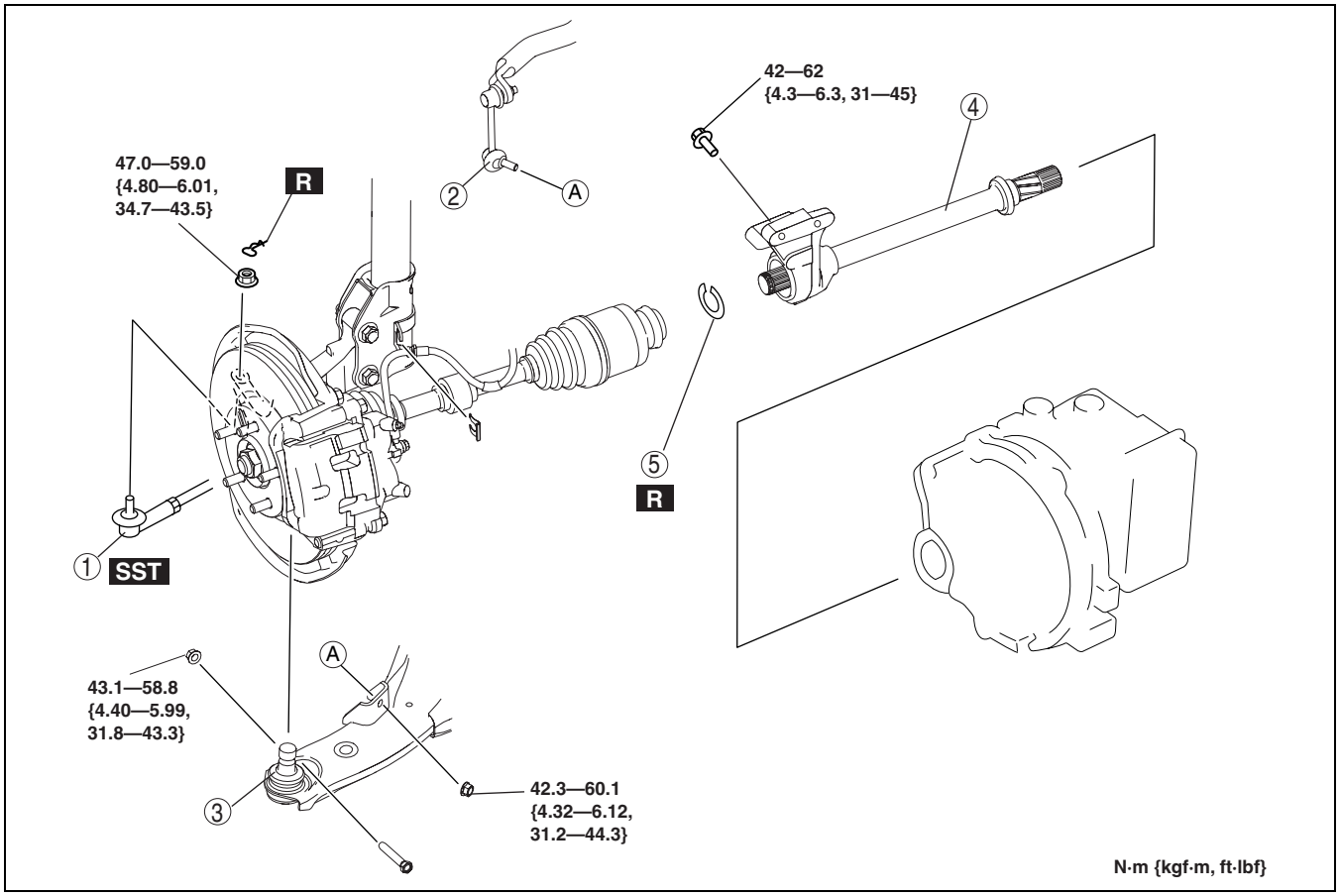
## JOINT SHAFT REMOVAL/INSTALLATION[2WD]

id0313008009a3

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while the vehicle is being serviced.**

1. Remove the side cover and under cover.
2. Remove the front ABS wheel-speed sensor. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3. Remove the crankshaft position (CKP) sensor. (See 01-40-42 CRANKSHAFT POSITION (CKP) SENSOR REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.

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| | |
|---|---|
| 1 | Tie-rod end ball joint<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION) |
| 2 | Stabilizer control link (lower side) |
| 3 | Lower arm ball joint |

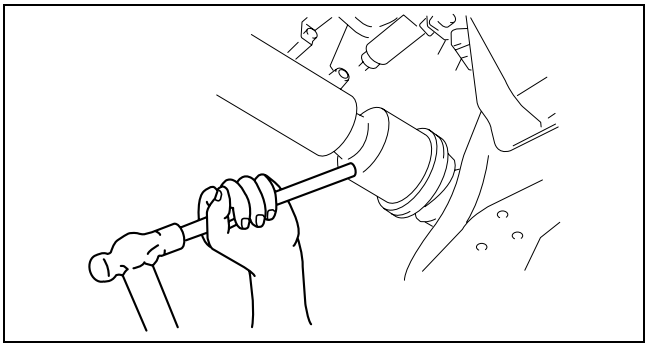
| | |
|---|---|
| 4 | Joint shaft<br>(See 03-13-4 Joint Shaft Removal Note) |
| 5 | Clip<br>(See 03-13-4 Clip Installation Note) |

**Joint Shaft Removal Note**

1. Separate the right side drive shaft from the joint shaft by tapping on a brass bar inserted between them.
2. Remove the bolts.
3. Pull the joint shaft straight out.

**Caution**

- **The sharp edges of the joint shaft can slice or puncture the oil seal. Be careful when removing the joint shaft from the transaxle.**



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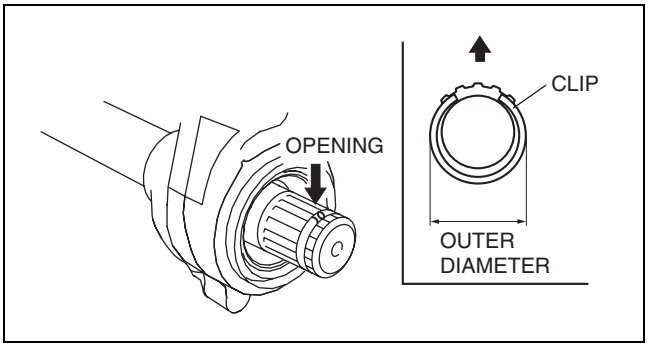
**Clip Installation Note**

1. Install a new clip onto the joint shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification on installation.
2. After installation, measure the outer diameter. If it exceeds the specification, repeat Step 1 using a new clip.

**Clip outer diameter specification**
**34.0 mm {1.34 in} max.**

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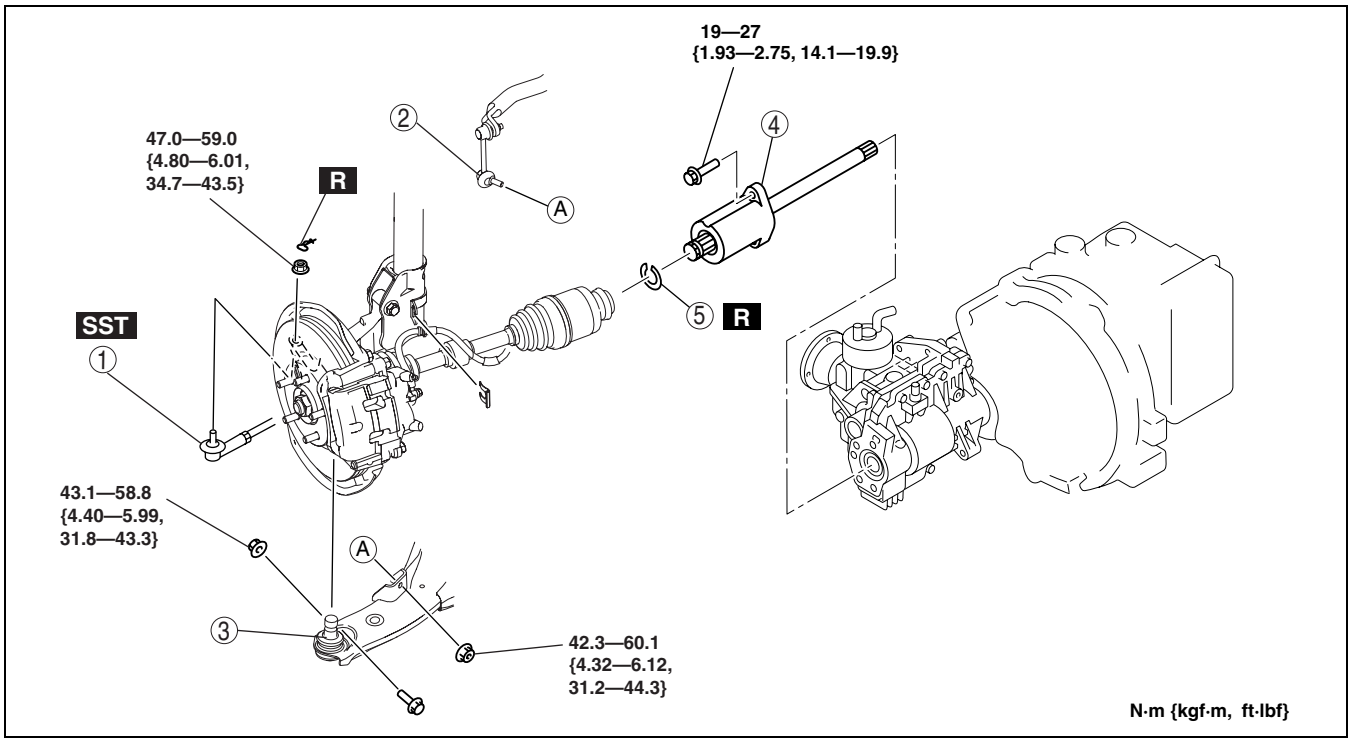
**JOINT SHAFT REMOVAL/INSTALLATION[AWD]**

id0313008009a5

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while the vehicle is being serviced.**

1. Remove the side cover and under cover.
2. Remove the front ABS wheel-speed sensor. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

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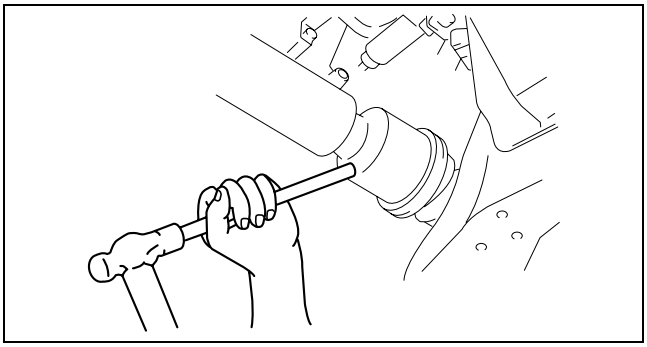
| | |
|---|---|
| 1 | Tie-rod end ball joint<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION) |
| 2 | Stabilizer control link (lower side) |
| 3 | Lower arm ball joint |
| 4 | Joint shaft<br>(See 03-13-5 Joint Shaft Removal Note) |
| 5 | Clip<br>(See 03-13-5 Clip Installation Note) |

**Joint Shaft Removal Note**

1. Separate the right side drive shaft from the joint shaft by tapping on a brass bar inserted between them.
2. Remove the bolts.
3. Pull the joint shaft straight out.

**Caution**

- **The sharp edges of the joint shaft can slice or puncture the oil seal. Be careful when removing the joint shaft from the transaxle.**



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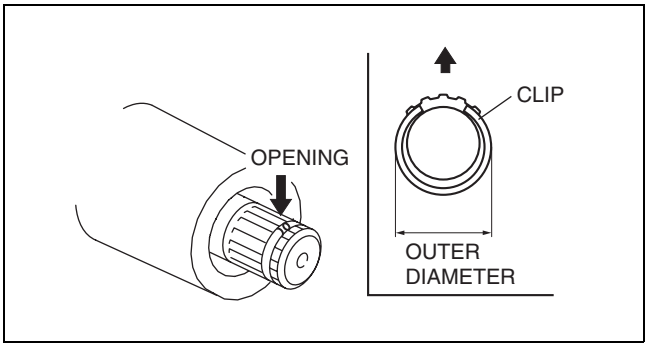
**Clip Installation Note**

1. Install a new clip onto the joint shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification on installation.

2. After installation, measure the outer diameter. If it exceeds the specification, repeat Step 1 using a new clip.

**Outer diameter specification**
**34.0 mm {1.34 in} max.**

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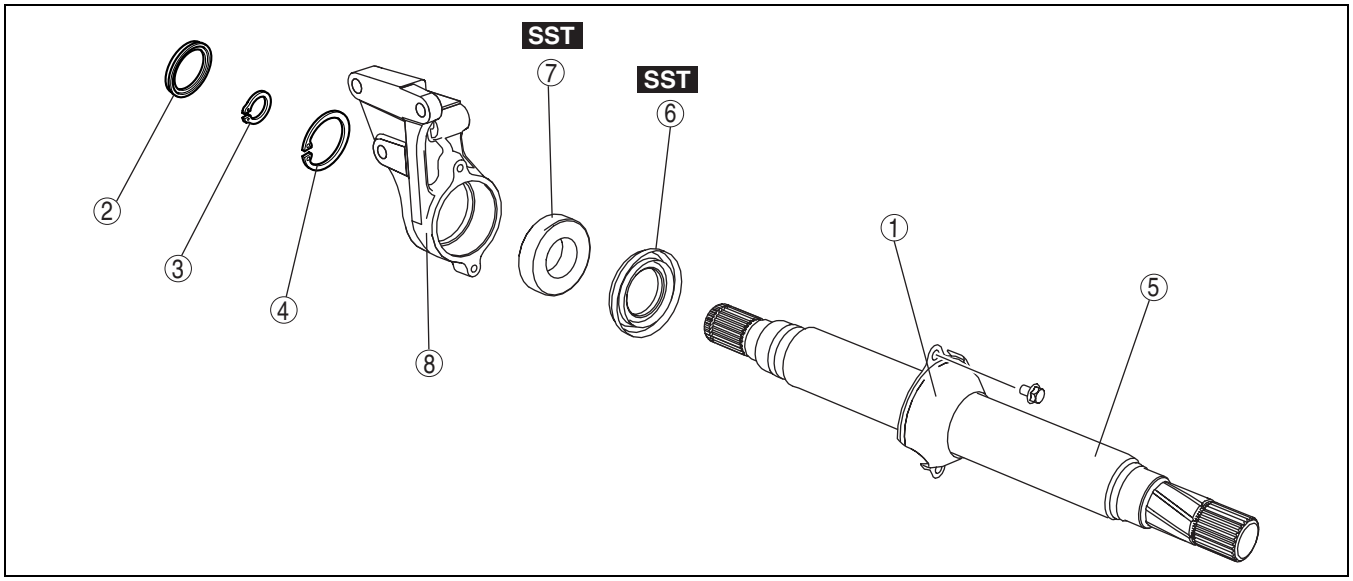
**JOINT SHAFT DISASSEMBLY[2WD]**

id0313008010a3

1. Disassemble in the order indicated in the table.

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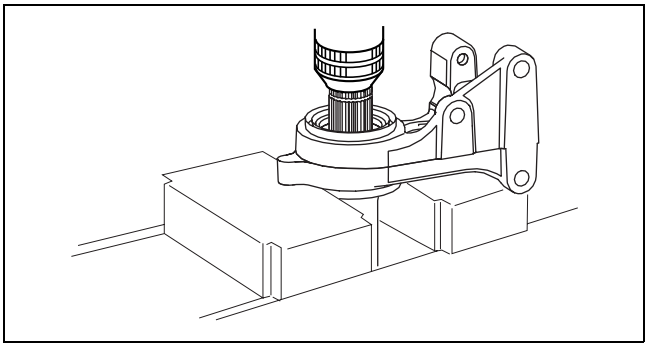
| | |
|---|---|
| 1 | Cover |
| 2 | Dust seal (axle side)<br>(See 03-13-6 Dust Seal (Axle Side) Disassembly Note) |
| 3 | Snap ring |
| 4 | Snap ring |
| 5 | Joint shaft<br>(See 03-13-6 Joint Shaft Disassembly Note) |
| 6 | Dust seal (differential side)<br>(See 03-13-7 Dust Seal (Differential Side) Disassembly Note) |
| 7 | Bearing<br>(See 03-13-7 Bearing Disassembly Note) |
| 8 | Bearing housing |

**Dust Seal (Axle Side) Disassembly Note**

1. Remove the dust seal using a flathead screwdriver.

**Joint Shaft Disassembly Note**

1. Remove the joint shaft using a press.



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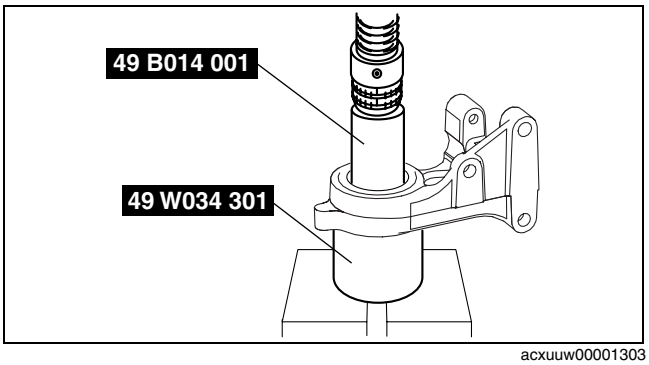
**Dust Seal (Differential Side) Disassembly Note**
1. Remove the dust seal using a flathead screwdriver.

**Bearing Disassembly Note**
1. Remove the bearing using a press and the **SSTs**.
   **Substitution SST**
   - **49 B014 001**
     Outer diameter: 47— 55 mm {1.9— 2.1 in}
   - **49 W034 301**
     Inner diameter: 67.5— 72 mm {2.7— 2.8 in}
     Inner depth: 16 mm {0.63 in} or more
     Plate thickness: 1 mm {0.04 in} or more



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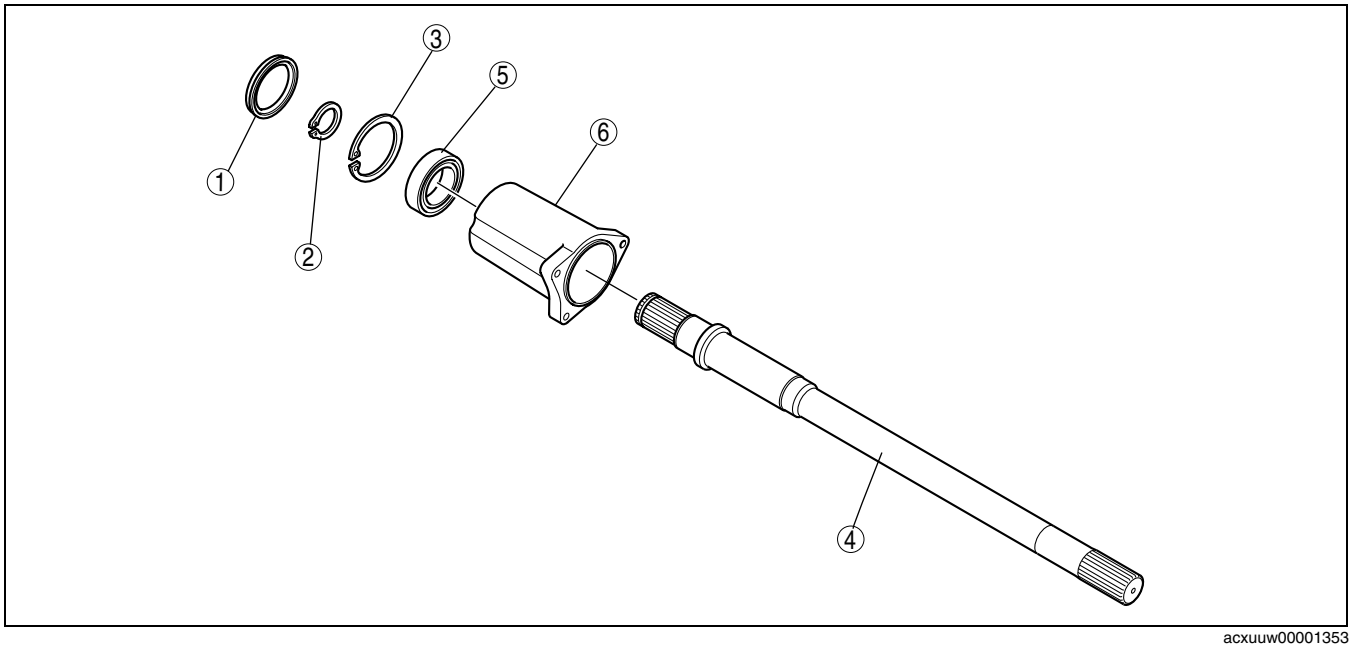
**JOINT SHAFT DISASSEMBLY[AWD]**

id0313008010a5

1. Disassemble in the order indicated in the table.



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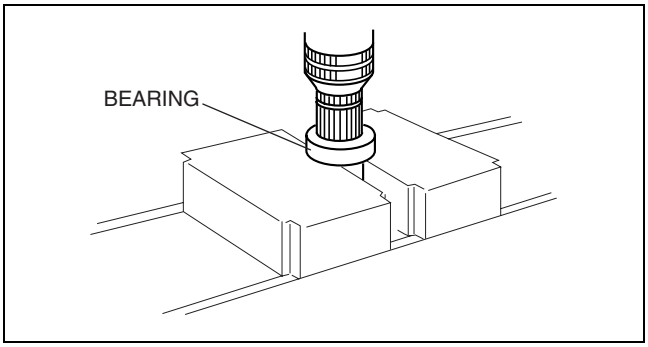
| | |
|---|---|
| 1 | Dust seal<br>(See 03-13-7 Dust Seal Disassembly Note) |
| 2 | Clip |
| 3 | Snap ring |

| | |
|---|---|
| 4 | Joint shaft |
| 5 | Bearing<br>(See 03-13-8 Bearing Disassembly Note) |
| 6 | Bearing housing |

**Dust Seal Disassembly Note**
1. Remove the dust seal using a flathead screwdriver.

**Bearing Disassembly Note**

1. Remove the bearing from the joint shaft using a press.

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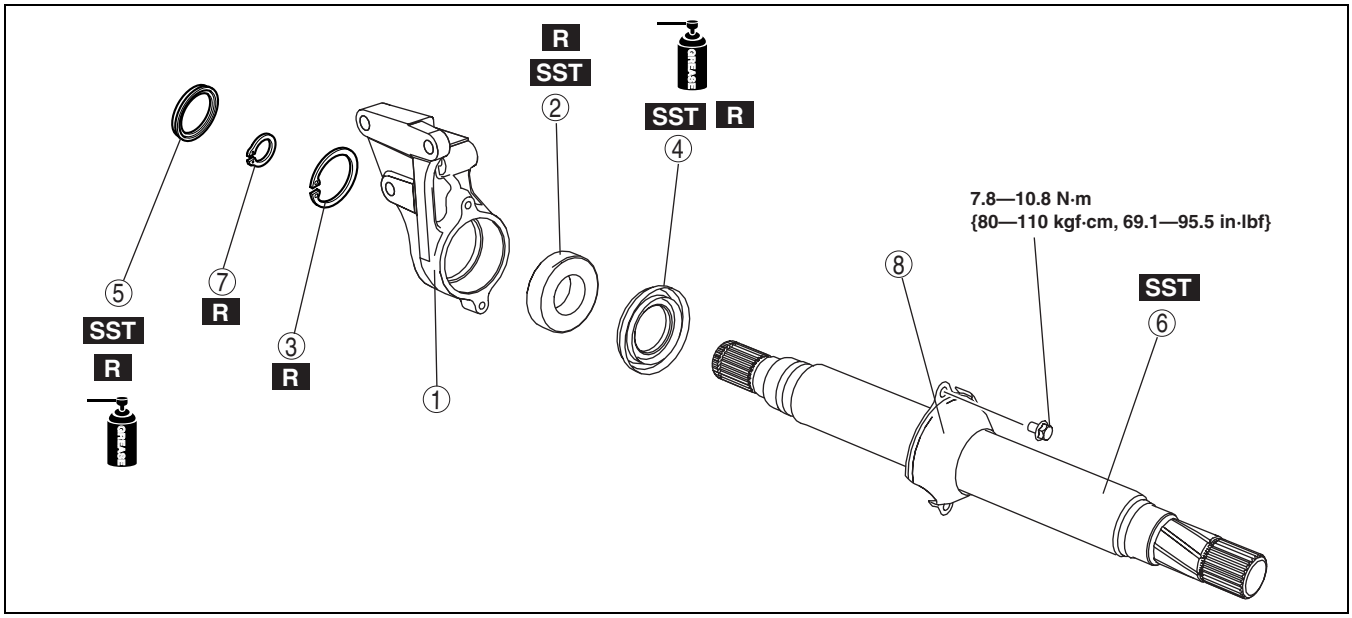
**JOINT SHAFT ASSEMBLY[2WD]**

id0313008011a3

1. Assemble in the order indicated in the table.

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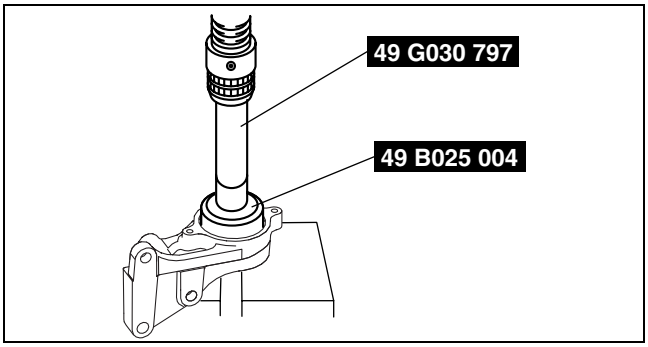
| | |
|---|---|
| 1 | Bearing housing |
| 2 | Bearing<br>(See 03-13-8 Bearing Assembly Note) |
| 3 | Snap ring |
| 4 | Dust seal (differential side)<br>(See 03-13-9 Dust Seal (Differential Side) Assembly Note) |

| | |
|---|---|
| 5 | Dust seal (axle side)<br>(See 03-13-9 Dust Seal (Axle Side) Assembly Note) |
| 6 | Joint shaft<br>(See 03-13-9 Joint Shaft Assembly Note) |
| 7 | Snap ring |
| 8 | Cover |

**Bearing Assembly Note**

1. Install the new bearing using a press and the **SSTs**.
   **Substitution SST**
   - **49 B025 004**
     Outer diameter: 61 mm {2.4 in}
     Inner diameter: 46 mm {1.8 in}

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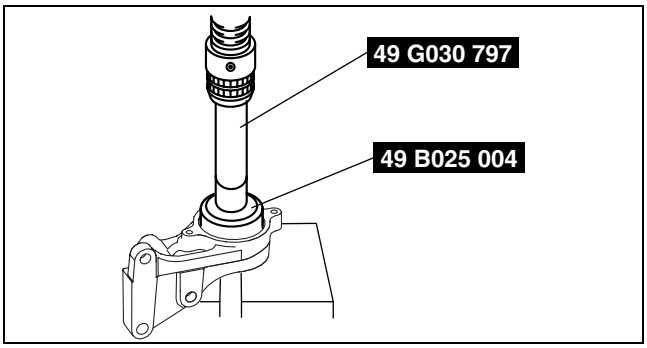
**Dust Seal (Differential Side) Assembly Note**

1. Apply grease to the new dust seal lip.
2. Install the dust seal (differential side) using a press and the **SSTs**.
   **Substitution SST**
   - **49 B025 004**
     Outer diameter: 58— 59.8 mm {2.2— 2.3 in} or less
     Inner diameter: 53 mm {2.1 in} or more
     Inner depth: 7.5 mm {0.30 in} or more

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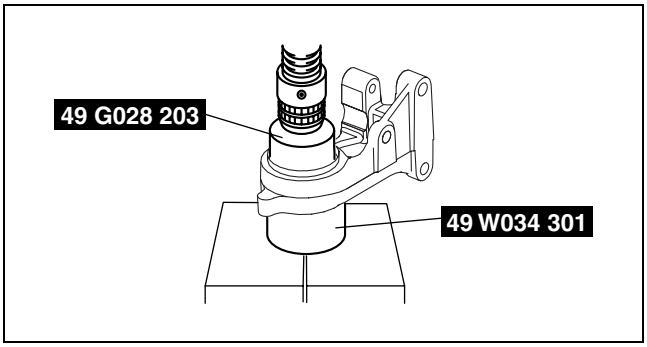
**Dust Seal (Axle Side) Assembly Note**

1. Apply grease to the new dust seal lip.
2. Install the dust seal (axle side) using a press and the **SSTs**.
   **Substitution SST**
   - **49 G028 203**
     Outer diameter: 64 mm {2.5 in} or more
     Inner diameter: 57.6— 59.0 mm {2.27— 2.32 in}
     Inner depth: 6.8 mm {0.27 in} or more
   - **49 W034 301**
     Inner diameter: 67.5— 72.0 mm {2.66— 2.83 in}
     Inner depth: 8.5 mm {0.33 in} or more
     Plate thickness: 1 mm {0.04 in} or more

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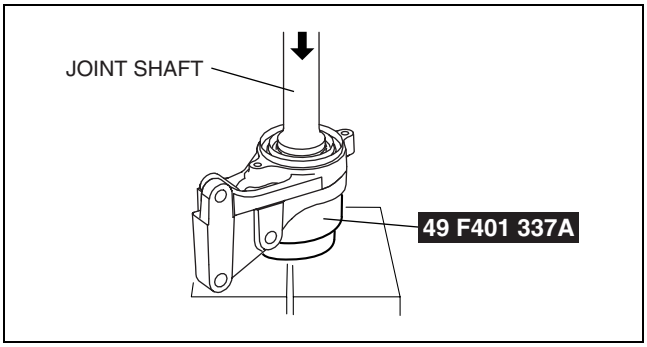
**Joint Shaft Assembly Note**

1. Install the joint shaft using a press and the **SST.**
   **Substitution SST**
   - **49 F401 337A**
     Outer diameter: 39— 42 mm {1.5— 1.6 in}
     Inner diameter: 35.2 mm {1.4 in} or more
     Inner depth: 48.5 mm {1.91 in} or more

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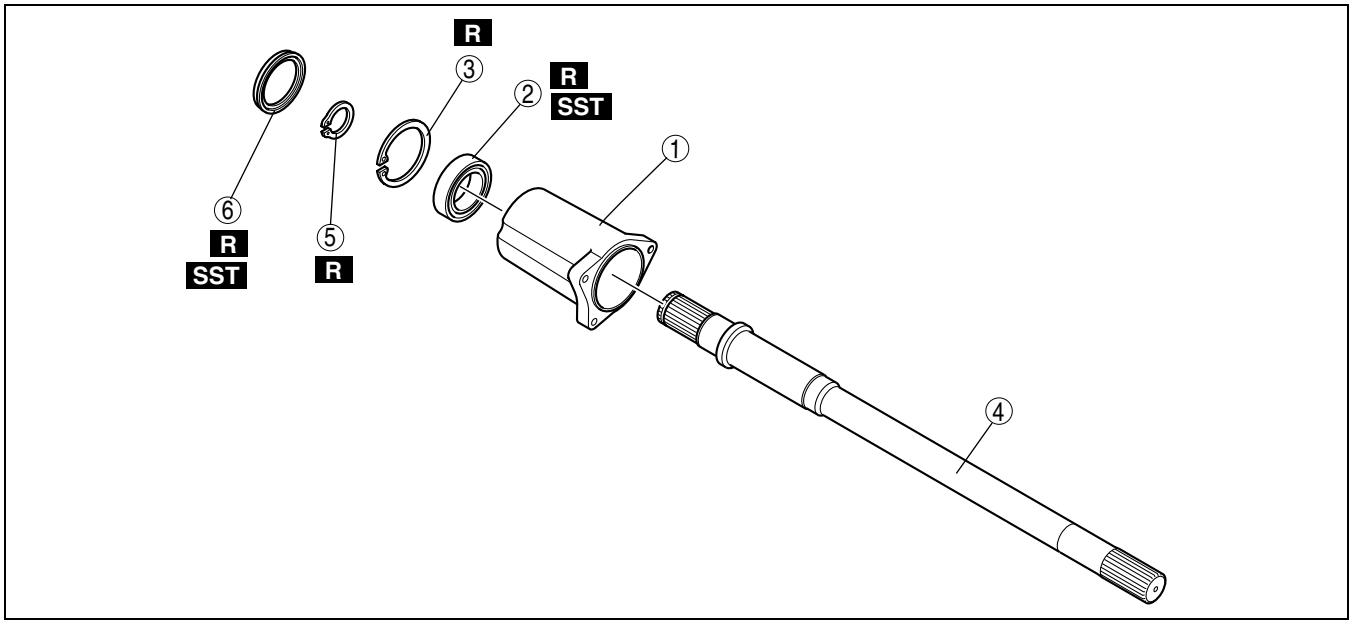
## JOINT SHAFT ASSEMBLY[AWD]

id0313008011a5

1. Assemble in the order indicated in the table.

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| | |
|---|---|
| 1 | Bearing housing |
| 2 | Bearing<br>(See 03-13-10 Bearing Assembly Note) |
| 3 | Snap ring |
| 4 | Joint shaft<br>(See 03-13-10 Joint Shaft Assembly Note) |
| 5 | Clip |
| 6 | Dust seal<br>(See 03-13-11 Dust Seal Assembly Note) |

**Bearing Assembly Note**

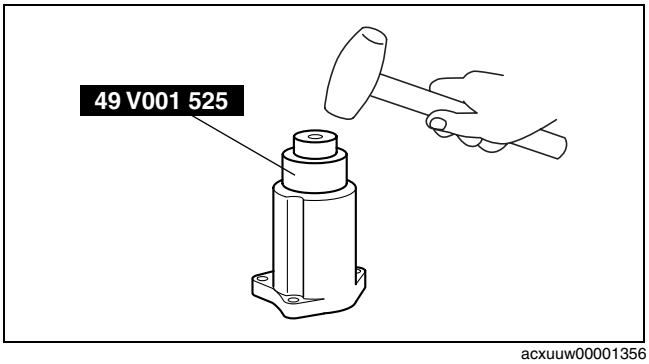
1. Install the new bearing to the bracket.

**Note**

- When the bearing is not installed to the bracket by hand, install it using the **SST**.

**Substitution SST**

- **49 V001 525**
  Outer diameter: 58— 61 mm {2.3— 2.4 in}

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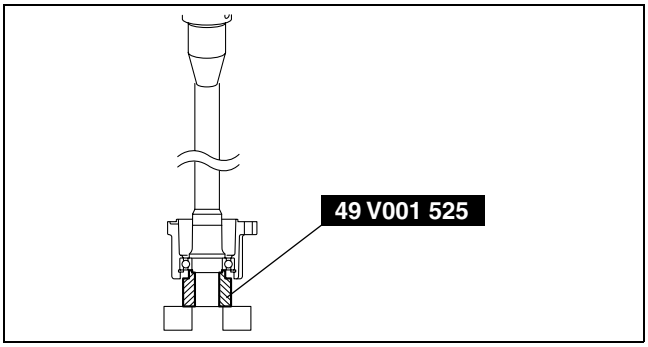
**Joint Shaft Assembly Note**

1. Install the joint shaft using a press and the **SST**.
   **Substitution SST**
   - **49 V001 525**
     Outer diameter: 58— 61 mm {2.3— 2.4 in}
     Inner diameter: 35.2— 39.6 mm {1.39— 1.55 in}
     Inner depth: 48.5 mm {1.91 in} or more

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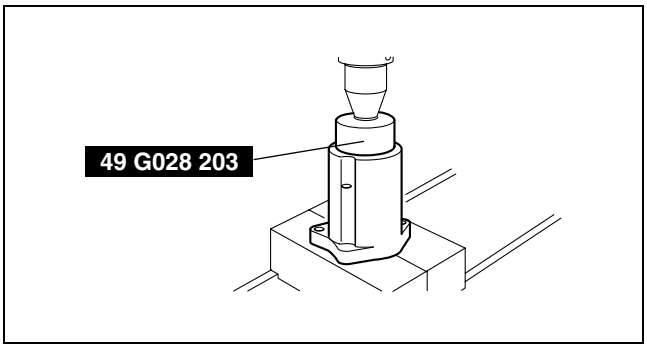
**Dust Seal Assembly Note**

1. Apply grease to the new dust seal lip.
2. Install the new dust seal using a press and the **SSTs**.
   **Substitution SST**
   - **49 G028 203**
     Outer diameter: 64 mm {2.5 in} or more
     Inner diameter: 57.6— 59.0 mm {2.27— 2.32 in}
     Inner depth: 38.5 mm {1.52 in} or more

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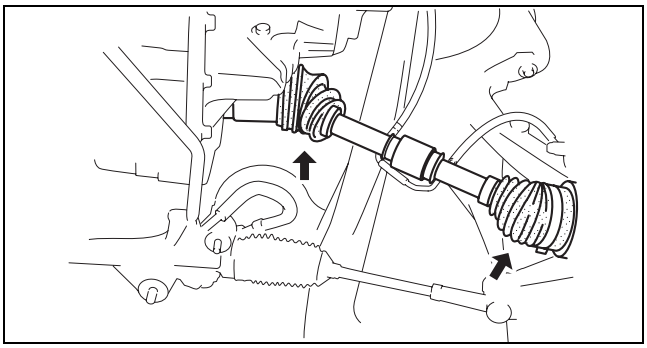
**FRONT DRIVE SHAFT PRE-INSPECTION**

id031300800200

1. Inspect the dust boot on the drive shaft for cracks, damage, leaking grease, and looseness in the boot band.
2. Inspect the drive shaft for bends, cracks, and wear in the joint or splines.
   - Repair or replace the drive shaft or boot/band as necessary.



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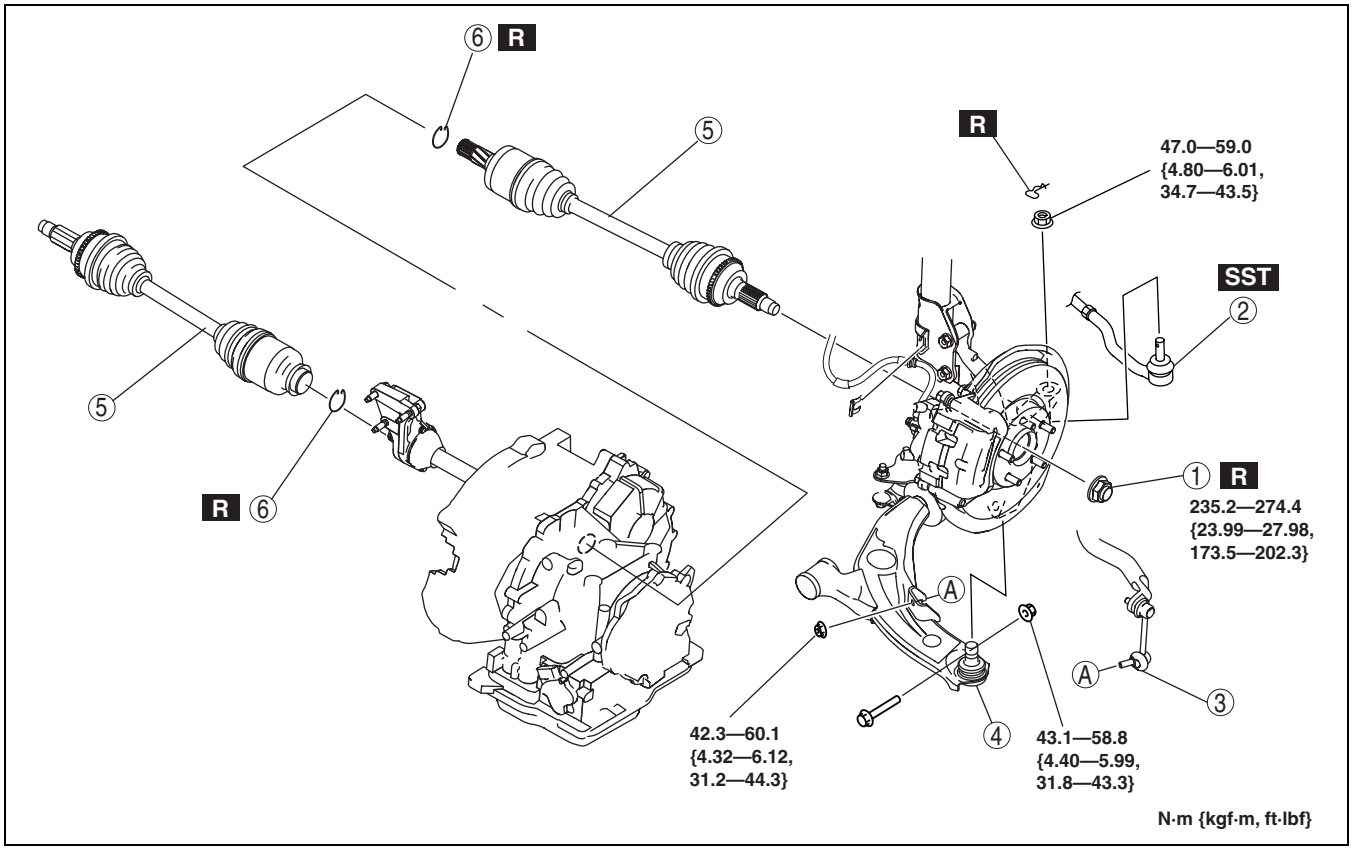
## FRONT DRIVE SHAFT REMOVAL/INSTALLATION

id031300800300

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while the vehicle is being serviced.**

1. Remove the side cover and under cover.
2. Remove the front ABS wheel-speed sensor. (See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.

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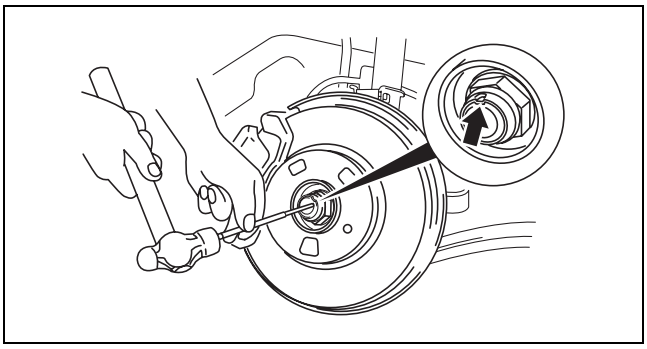
| | |
|---|---|
| 1 | Locknut<br>(See 03-13-13 Locknut Removal Note.)<br>(See 03-13-14 Locknut Installation Note.) |
| 2 | Tie-rod end ball joint<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.) |
| 3 | Front stabilizer control link (lower side) |
| 4 | Front lower arm ball joint |
| 5 | Front drive shaft<br>(See 03-13-13 Front Drive Shaft Removal Note.)<br>(See 03-13-14 Front Drive Shaft Installation Note.) |
| 6 | Clip<br>(See 03-13-13 Clip Installation Note.) |

**Locknut Removal Note**

1. Lock the hub by applying the brakes.
2. Knock the crimped portion of the locknut outward using a small chisel and a hammer.
3. Remove the locknut.



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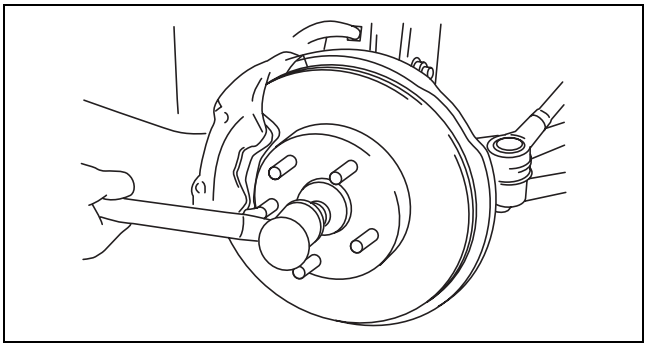
**Front Drive Shaft Removal Note**

1. Install a spare nut onto the drive shaft so that the nut is flush with the end of the drive shaft.
2. Tap the nut with a copper hammer to loosen the drive shaft from the front wheel hub.
3. Separate the drive shaft from the wheel hub.

**Caution**

- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful when removing the drive shaft from the transaxle.**



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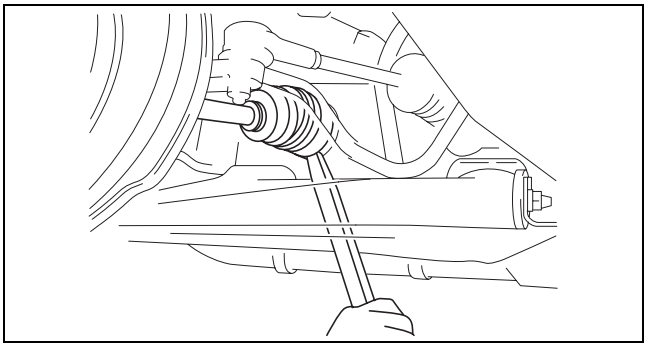
4. Separate the left side drive shaft from the transaxle by prying with a bar inserted between the outer ring and the transaxle, as shown in the figure.



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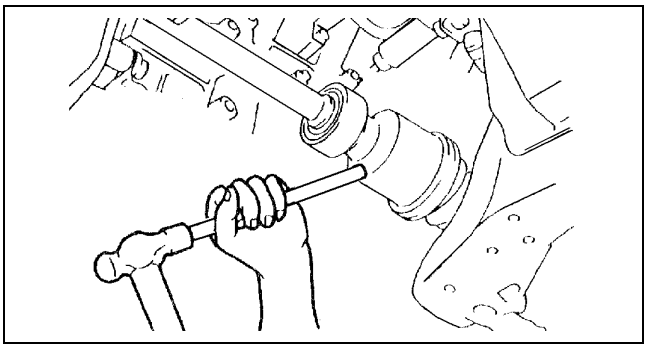
5. Separate the right side drive shaft from the joint shaft by tapping on a bar inserted between them.



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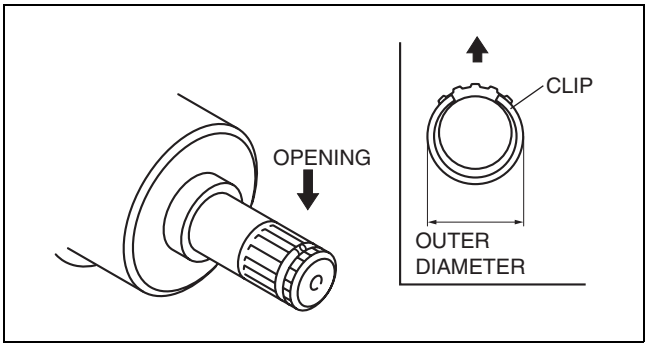
**Clip Installation Note**

1. Install a new clip onto the drive shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification on installation.

2. After installation, measure the outer diameter. If it exceeds the specification, repeat Steps 1— 2 using a new clip.

**Clip outer diameter specification**
**LH: 33.5 mm {1.32 in}**
**RH (joint shaft): 34.0 mm {1.34 in}**



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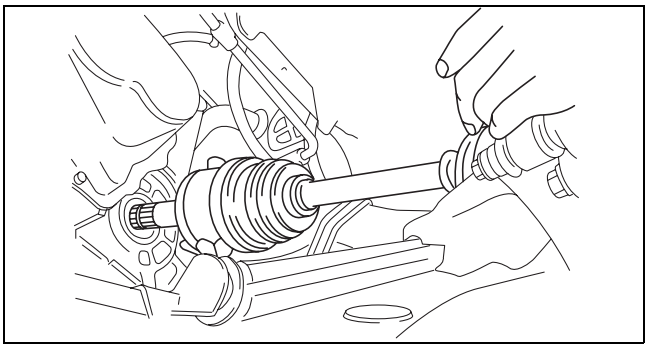
**Front Drive Shaft Installation Note**

**Caution**
- **The sharp edges of the drive shaft can slice or puncture the oil seal. Be careful when installing the drive shaft to the transaxle.**
- **The oil seals are damaged easily if this procedure is not done correctly.**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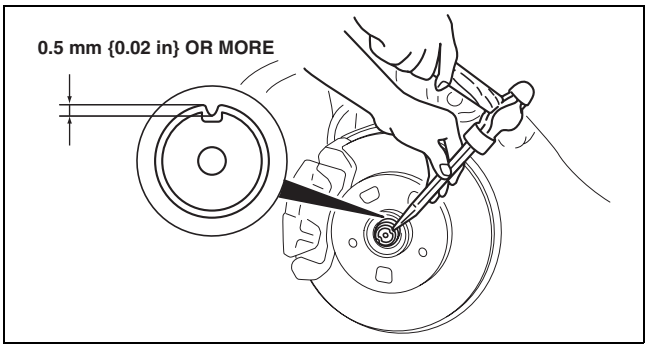
**Left side**
1. Insert the drive shaft into the wheel hub.
2. Apply transaxle oil to the oil seal lip.
3. Push the drive shaft into the transaxle.
4. After installation, pull the transaxle side outer ring forward to confirm that the drive shaft is securely held by the clip.

**Right side**
1. Insert the drive shaft into the wheel hub.
2. Insert the drive shaft into the joint shaft.
3. After installation, pull the transaxle side outer ring forward to confirm that the drive shaft is securely held by the clip.

**Locknut Installation Note**
1. Install a new locknut and stake it as shown.



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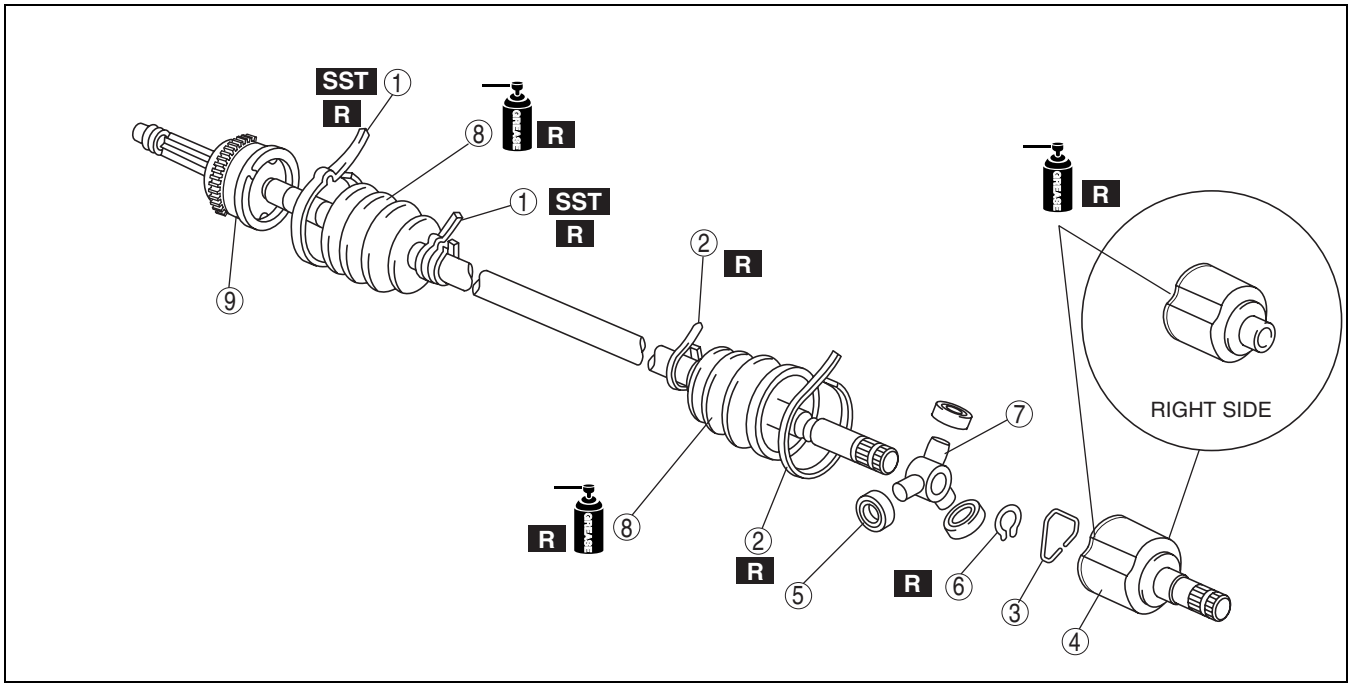
## FRONT DRIVE SHAFT DISASSEMBLY/ASSEMBLY

id031300800400

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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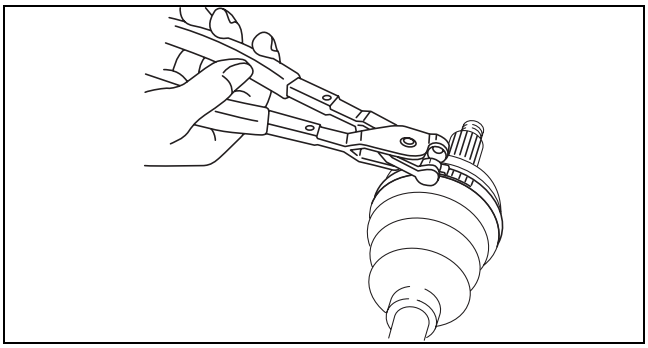
| | |
|---|---|
| 1 | Boot band (wheel side)<br>(See 03-13-16 Boot Band (Wheel Side) Disassembly Note.)<br>(See 03-13-19 Boot Band (Wheel Side) Assembly Note.) |
| 2 | Boot band (transaxle side)<br>(See 03-13-16 Boot Band (Transaxle Side) Disassembly Note.)<br>(See 03-13-18 Boot Band (Transaxle Side) Assembly Note.) |
| 3 | Clip |
| 4 | Outer ring<br>(See 03-13-16 Outer Ring Disassembly Note.)<br>(See 03-13-18 Outer Ring Assembly Note.) |
| 5 | Roller cassette |
| 6 | Snap ring<br>(See 03-13-17 Snap Ring, Tripod Joint Disassembly Note.)<br>(See 03-13-18 Tripod Joint, Snap Ring Assembly Note.) |
| 7 | Tripod joint<br>(See 03-13-17 Snap Ring, Tripod Joint Disassembly Note.)<br>(See 03-13-18 Tripod Joint, Snap Ring Assembly Note.) |
| 8 | Boot<br>(See 03-13-17 Boot Disassembly Note.)<br>(See 03-13-17 Boot Assembly Note.) |
| 9 | Shaft and ball joint component |

**Boot Band (Wheel Side) Disassembly Note**

**Note**
- The boot band does not need to be removed unless it is being replaced.

1. Remove the boot clamp with end clamp pliers as shown and discard the clamp.



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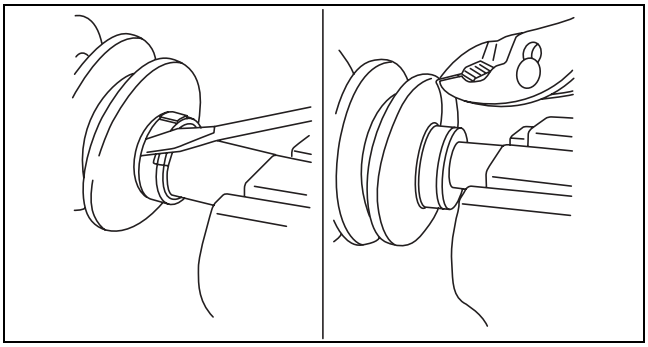
**Boot Band (Transaxle Side) Disassembly Note**
1. Pry up the locking clips using a screwdriver.
2. Pull back the end of the band.



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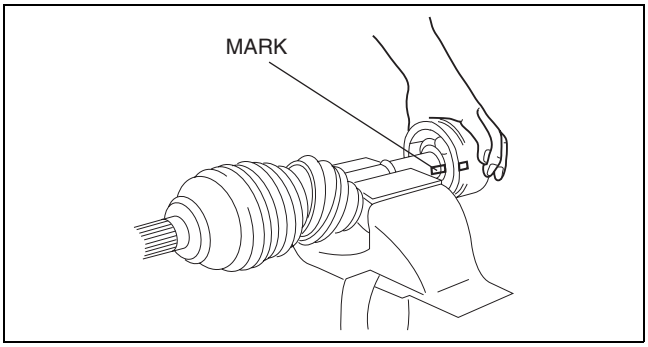
**Outer Ring Disassembly Note**
1. Mark the outer ring and the shaft for proper assembly.

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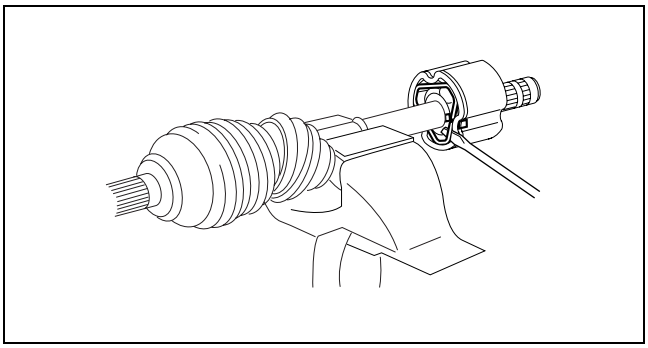
2. Remove the clip.
3. Remove the outer ring.



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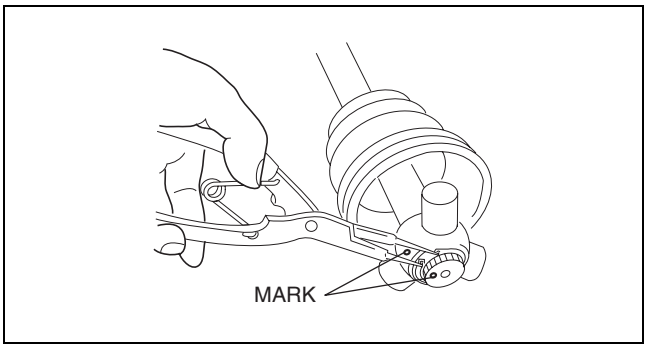
**Snap Ring, Tripod Joint Disassembly Note**

1. Mark the shaft and tripod joint for proper assembly.
2. Remove the snap ring using snap-ring pliers.
3. Remove the tripod joint from the shaft.

**Caution**
- **Do not tap the tripod joint with a hammer.**

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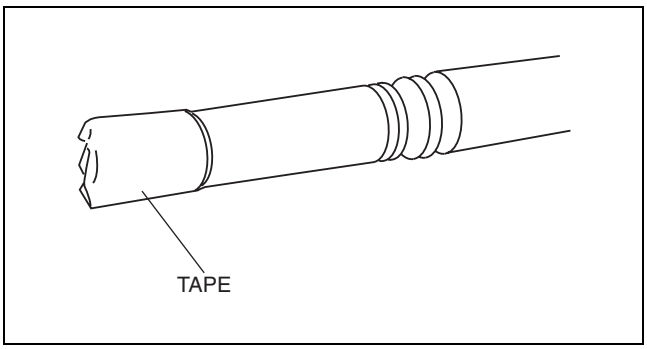
**Boot Disassembly Note**

**Note**
- The wheel side boot does not need to be removed unless replacing it or the ball joint and shaft component.
- Do not strip the tape until the boot is assembled.

1. Wrap the shaft splines with tape.
2. Remove the boot.

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**Boot Assembly Note**

**Note**
- The wheel side and transaxle side boots are different.

1. Fill the boot (wheel side) with the specified grease.

**Caution**
- **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

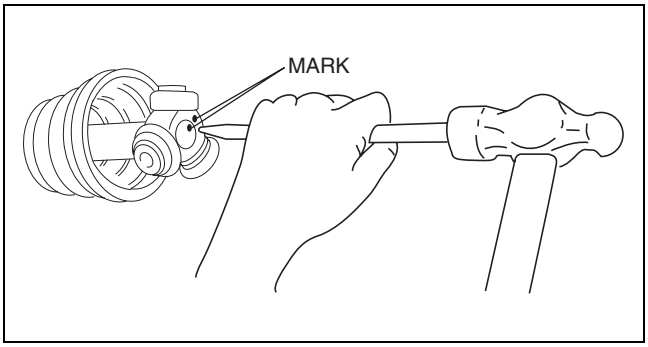
**Grease amount**
**110— 130 g {3.89— 4.58 oz}**

2. With the splines of the shaft still wrapped in tape from disassembly, install the boot.
3. Remove the tape.

**Tripod Joint, Snap Ring Assembly Note**

1. Align the marks and install the tripod joint using a bar and a hammer.
2. Install the new snap ring using snap-ring pliers.

**Caution**
- **Be sure the snap ring engages correctly in the groove of the shaft.**



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**Outer Ring Assembly Note**

1. Fill the outer ring and boot (transaxle side) with the specified grease.

**Caution**
- **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

**Grease amount**
**240— 260 g {8.48— 9.17 oz}**

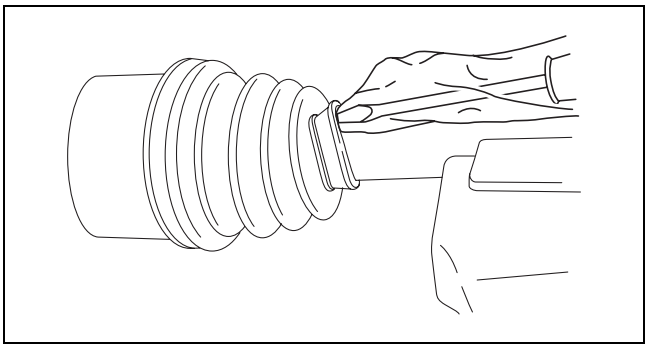
2. Install the roller cassettes.
3. Align the marks, and install the outer ring on to the shaft.
4. Install a new clip.
5. Install the boot.
6. Set the drive shaft to the standard length.

**Front drive shaft length**
**LH: 658.2— 668.2 mm {25.92— 26.30 in}**
**RH: 621.2— 631.2 mm {24.46— 24.85 in}**

7. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth- wrapped flathead screwdriver.

**Caution**
- **Do not let grease leak.**
- **Do not damage the boot.**

8. Verify that the drive shaft length is within the standard.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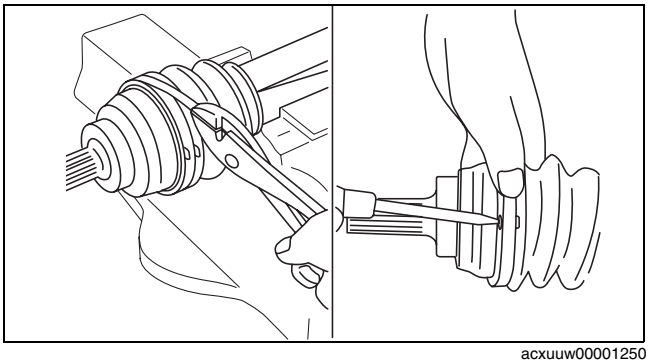
**Boot Band (Transaxle Side) Assembly Note**

1. Fold the band in the direction opposite to the forward revolving direction of the drive shaft and use pliers to pull it tight.
2. Lock the end of the band by bending the locking clips.

**Caution**
- **Install the band into the groove securely.**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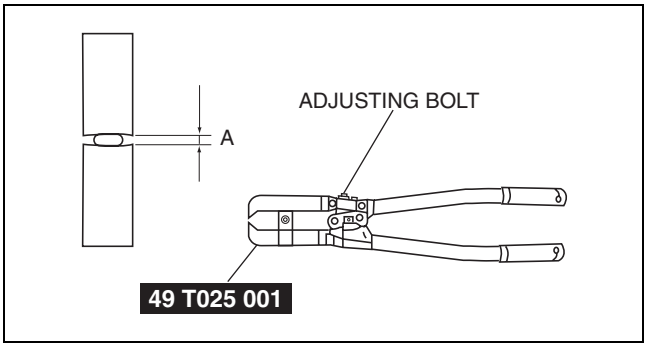
**Boot Band (Wheel Side) Assembly Note**

1. Adjust clearance A by turning the adjusting bolt of the **SST**.

   **Clearance A**
   **2.9 mm {0.11 in}**

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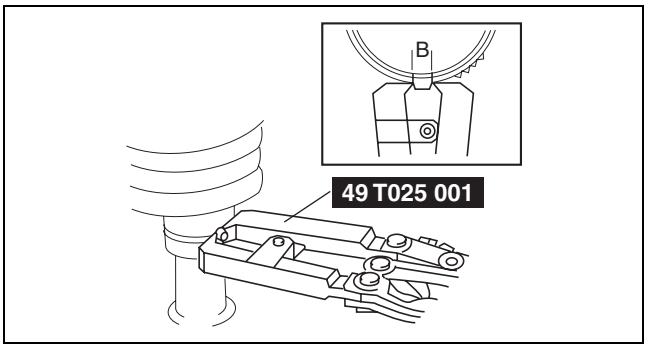
2. Crimp the wheel side small boot band using the **SST**. Verify that clearance B is within the specification.
   - If clearance B is more than the specification, reduce clearance A of the **SST** and crimp the boot again.
   - If clearance B is less than the specification, replace the boot band, increase clearance A of the **SST**, and crimp the new boot.

   **Clearance B**
   **2.4— 2.8 mm {0.095— 0.110 in}**

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3. Verify that the boot band does not protrude from the boot band installation area.
   - If it does, replace the boot band and repeat Steps 2 and 3.
4. Fill the boot with the repair kit grease.
5. Adjust clearance A by turning the adjusting bolt of the **SST**.

   **Clearance A**
   **3.2 mm {0.13 in}**

6. Crimp the wheel side big boot band using the **SST**.
7. Verify that clearance B is within the specification.
   - If clearance B is more than the specification, reduce clearance A of the **SST** and crimp the boot again.
   - If clearance B is less than the specification, replace the boot band, increase clearance A of the **SST** and crimp the new boot.

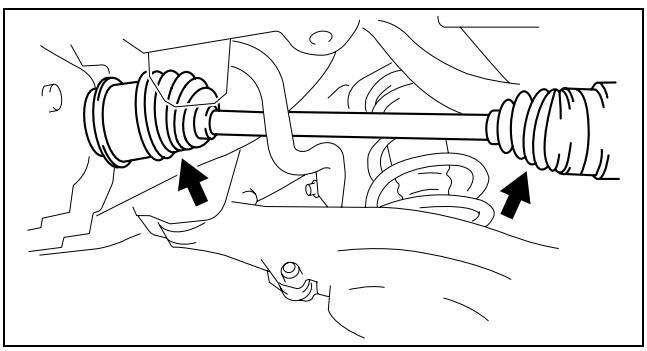
   **Clearance B**
   **2.4— 2.8 mm {0.095— 0.110 in}**

8. Verify that the boot band does not protrude from the boot band installation area.
   - If it does, replace the boot band and repeat Steps 7 and 8.

**REAR DRIVE SHAFT PRE-INSPECTION**

id031300800500

1. Inspect each connecting part for looseness.
   - Tighten or replace parts if necessary.
2. Inspect the dust boot on the drive shaft for cracks, damage, leaking grease, and looseness in the boot band.
3. Inspect the drive shaft for bends, cracks, and wear in the joints or splines.
   - Repair or replace the drive shaft or boot band if necessary.



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## REAR DRIVE SHAFT REMOVAL/INSTALLATION

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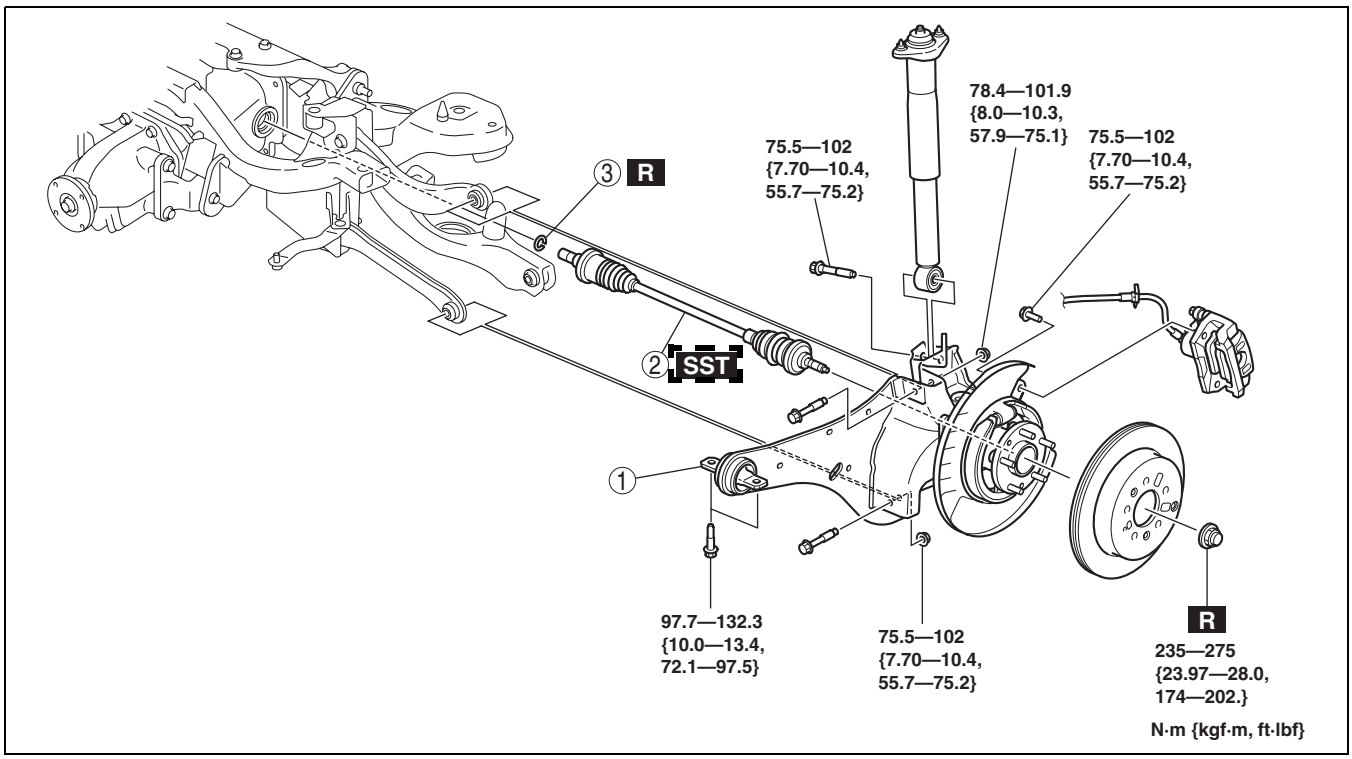
**Caution**
- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (wheel side) and fix it to an appropriate place where the sensor will not be pulled by mistake while the vehicle is being serviced.**

1. Drain the rear differential oil into a container. (See 03-14-2 DIFFERENTIAL OIL REPLACEMENT.)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, add the specified rear differential oil. (See 03-14-2 DIFFERENTIAL OIL REPLACEMENT.)
5. Inspect the rear wheel alignment and adjust it if necessary. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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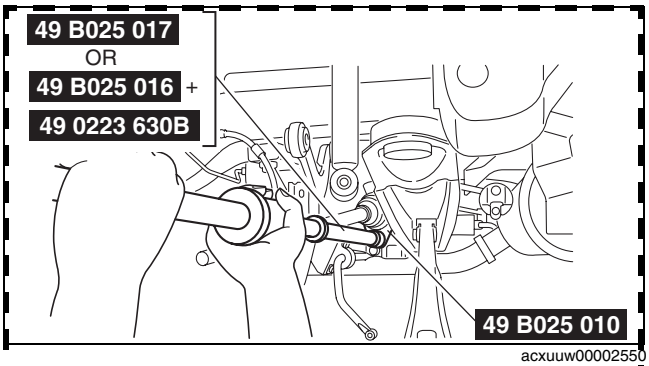
| | |
|---|---|
| 1 | Trailing link, knuckle component<br>(See 02-14-15 TRAILING LINK REMOVAL/ INSTALLATION[AWD]) |

| | |
|---|---|
| 2 | Rear drive shaft<br>(See 03-13-20 Rear Drive Shaft Removal Note) |
| 3 | Clip<br>(See 03-13-21 Clip Installation Note) |

**Rear Drive Shaft Removal Note**

1. Disengage the rear drive shaft using the **SSTs**.

**Note**
- Be careful not to damage the rear differential oil seal.

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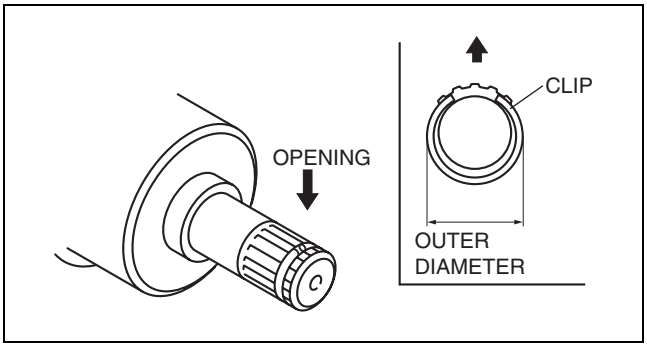
**Clip Installation Note**

1. Install a new clip onto the joint shaft with the opening facing upward. Ensure that the diameter of the clip does not exceed the specification on installation.
2. After installation, measure the outer diameter. If it exceeds the specification, repeat Steps 1— 2 using a new clip.

**Clip outer diameter specification**
**29.5 mm {1.16 in} max.**

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**REAR DRIVE SHAFT DISASSEMBLY/ASSEMBLY**

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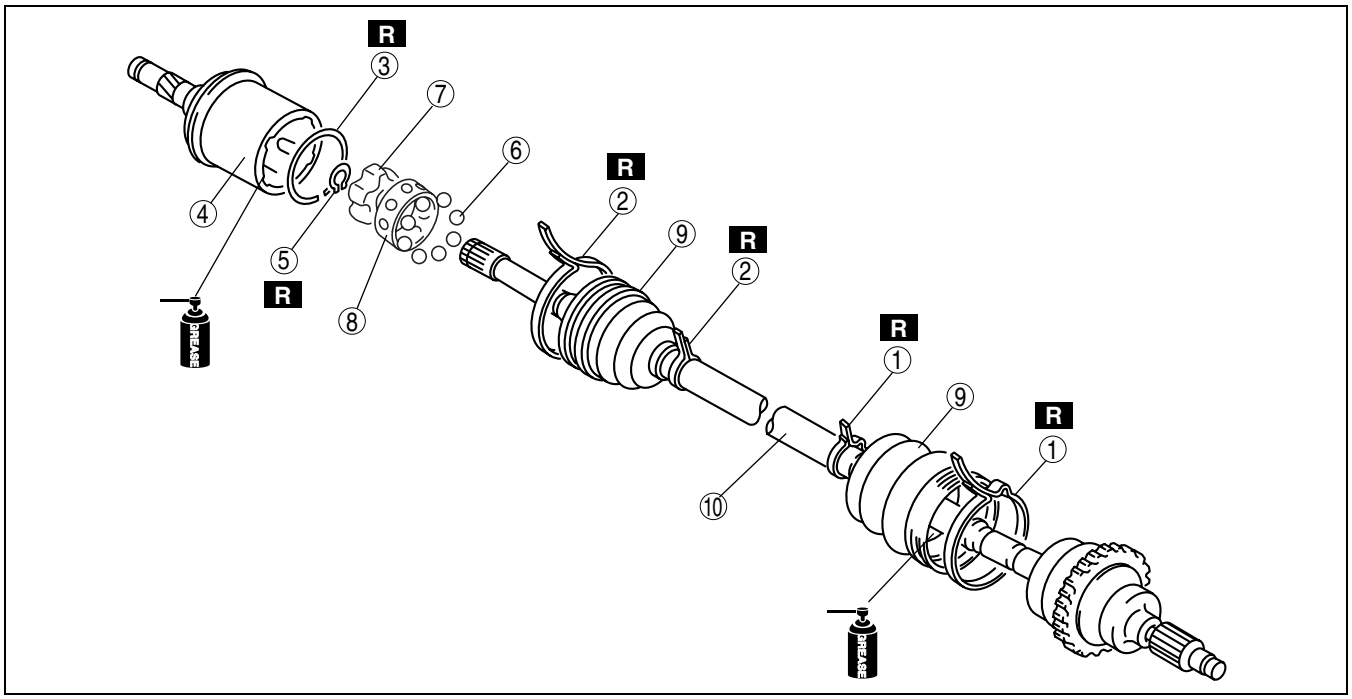
1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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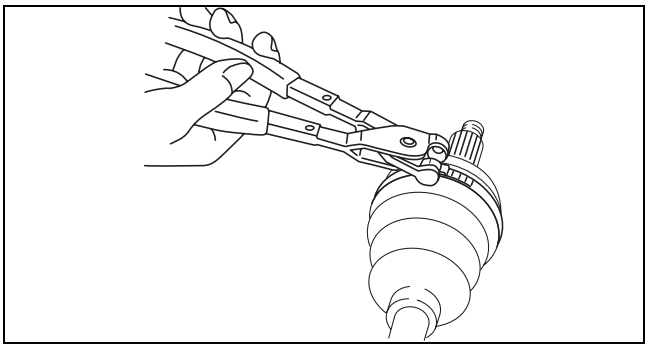
| | |
|---|---|
| 1 | Boot band (wheel side)<br>(See 03-13-22 Boot Band (Wheel Side) Disassembly Note)<br>(See 03-13-25 Boot Band (Wheel Side) Assembly Note) |
| 2 | Boot band (differential side)<br>(See 03-13-22 Boot Band (Differential Side) Disassembly Note)<br>(See 03-13-24 Boot Band (Differential Side) Assembly Note) |
| 3 | Clip<br>(See 03-13-22 Clip Disassembly Note)<br>(See 03-13-24 Outer Ring, Clip Assembly Note) |
| 4 | Outer ring<br>(See 03-13-24 Outer Ring, Clip Assembly Note) |
| 5 | Snap ring<br>(See 03-13-22 Snap Ring Disassembly Note)<br>(See 03-13-23 Cage, Inner Ring, Balls, Snap Ring Assembly Note) |

| | |
|---|---|
| 6 | Balls<br>(See 03-13-23 Balls, Inner Ring, Cage Disassembly Note)<br>(See 03-13-23 Cage, Inner Ring, Balls, Snap Ring Assembly Note) |
| 7 | Inner Ring<br>(See 03-13-23 Balls, Inner Ring, Cage Disassembly Note)<br>(See 03-13-23 Cage, Inner Ring, Balls, Snap Ring Assembly Note) |
| 8 | Cage<br>(See 03-13-23 Balls, Inner Ring, Cage Disassembly Note)<br>(See 03-13-23 Cage, Inner Ring, Balls, Snap Ring Assembly Note) |
| 9 | Boot<br>(See 03-13-23 Boot Assembly Note) |
| 10 | Drive shaft, joint component |

**Boot Band (Wheel Side) Disassembly Note**

**Note**
- The boot band does not need to be removed unless it is being replaced.

1. Remove the boot clamp with end clamp pliers as shown and discard the clamp.



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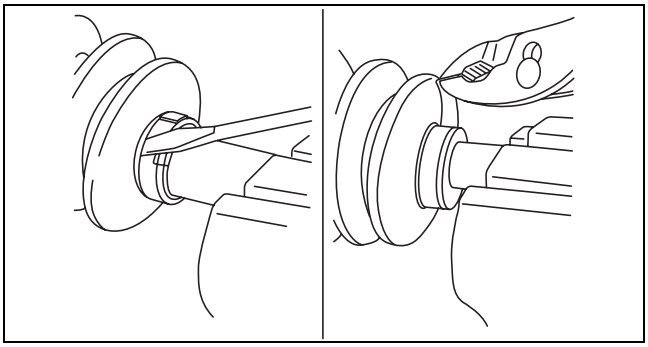
**Boot Band (Differential Side) Disassembly Note**
1. Pry up the locking clips using a screwdriver.
2. Pull back the end of the band.



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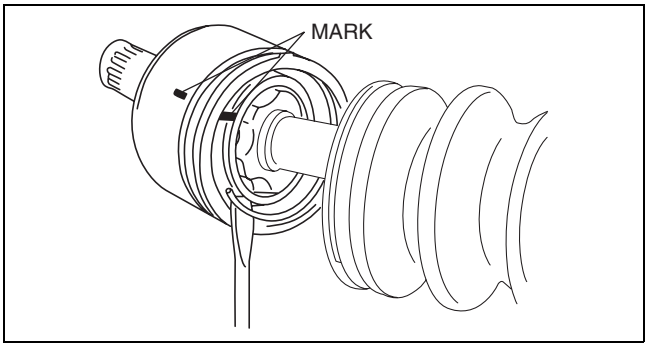
**Clip Disassembly Note**
1. Mark the drive shaft and outer ring for proper assembly.

**Caution**
- **Mark with paint; do not use a punch.**

2. Remove the clip.

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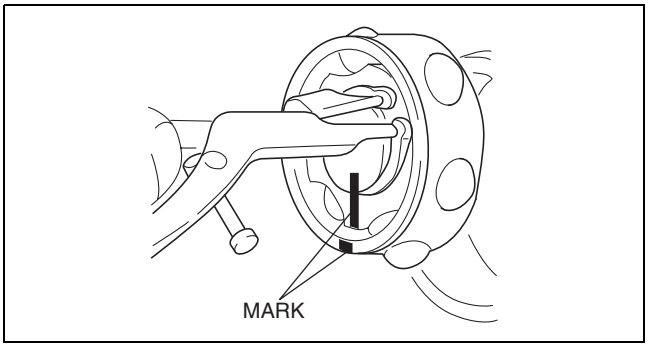
**Snap Ring Disassembly Note**
1. Mark the drive shaft end and inner ring for proper reassembly.

**Caution**
- **Mark with paint; do not use a punch.**

2. Remove the snap ring using snap-ring pliers.

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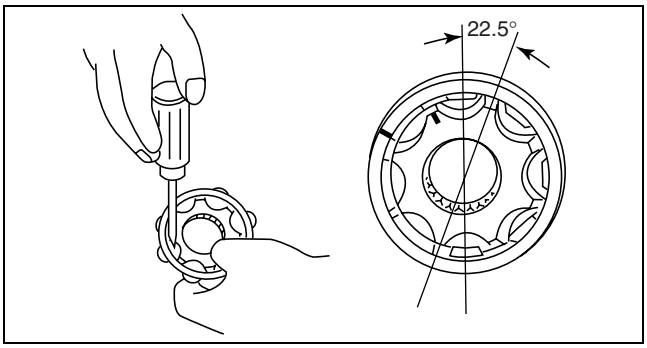
**Balls, Inner Ring, Cage Disassembly Note**

1. Mark the inner ring and cage for proper reassembly.

**Caution**
- **Mark with paint; do not use a punch.**

2. Turn the cage **approx. 22.5**° and pull the cage and balls from the inner ring.

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**Boot Assembly Note**

**Note**
- The wheel side and differential side boots are different.

1. Fill the wheel side boot with the specified grease.

**Caution**
- **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

**Grease amount**
**70— 90 g {2.48— 3.17 oz}**

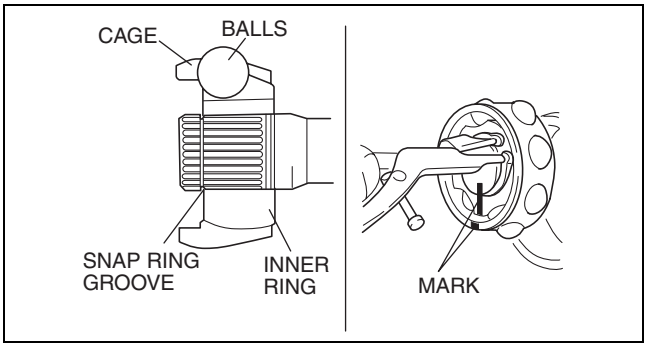
2. With the splines of the shaft wrapped in tape, install the boot.
3. Remove the tape.

**Cage, Inner Ring, Balls, Snap Ring Assembly Note**

1. Align the marks and install the balls and cage to the inner ring in the direction shown in the figure.

**Caution**
- **Install the cage so that the major diameter is at the same side as the snap ring groove. If incorrectly installed, the drive shaft may become disengaged.**

2. Align the marks and install the inner ring to the shaft.
3. Install a new snap ring.

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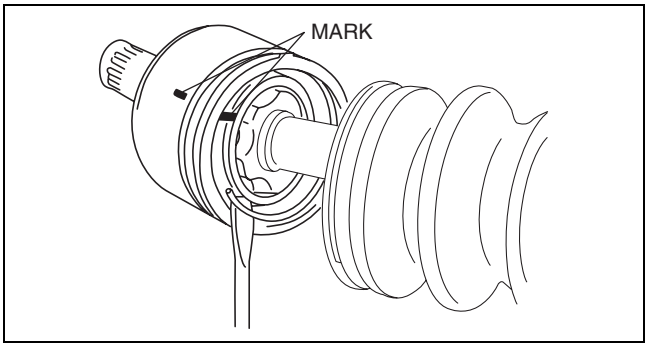
**Outer Ring, Clip Assembly Note**

1. Fill the outer ring and boot (differential side) with the specified grease.

**Caution**
- **Do not touch grease with your hand. Apply it from the tube to prevent foreign matter from entering the boot.**

**Grease amount**
**90— 110 g {3.18— 3.88 oz}**

2. Align the marks, and install the outer ring on to the shaft.
3. Install a new clip to the outer ring clip groove.
4. Install the boot.



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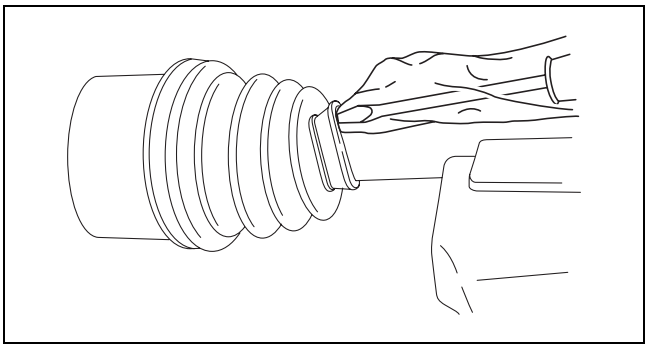
5. Release any trapped air from the boots by carefully lifting up the small end of each boot with a cloth wrapped screwdriver.

**Caution**
- **Do not let grease leak.**
- **Do not damage the boot.**

6. Set the drive shaft to the standard length.

**Rear drive shaft standard length**
**LH: 840.8— 850.8 mm {33.11— 33.49 in}**
**RH: 862.3— 872.3 mm {33.95— 34.34 in}**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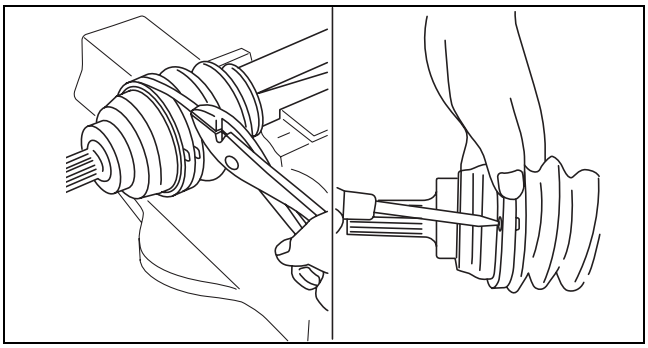
7. Verify that the drive shaft length is within the standard.
   - If not, repeat from Step 5.

**Boot Band (Differential Side) Assembly Note**

1. Fold the band in the direction opposite to the forward revolving direction of the drive shaft and use pliers to pull it tight.
2. Lock the end of the band by bending the locking clips.

**Caution**
- **Install the band into the groove securely.**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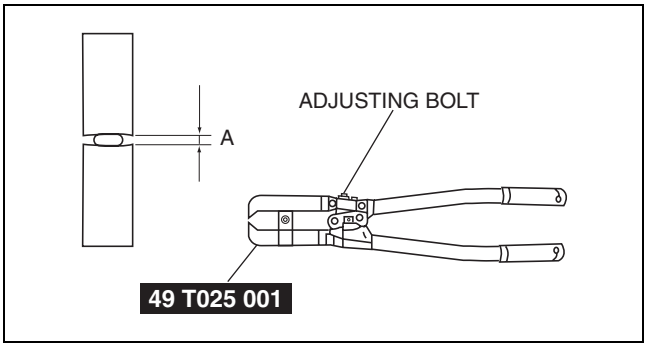
**Boot Band (Wheel Side) Assembly Note**

1. Adjust clearance A by turning the adjusting bolt of the **SST**.

   **Clearance A**
   **2.9 mm {0.11 in}**

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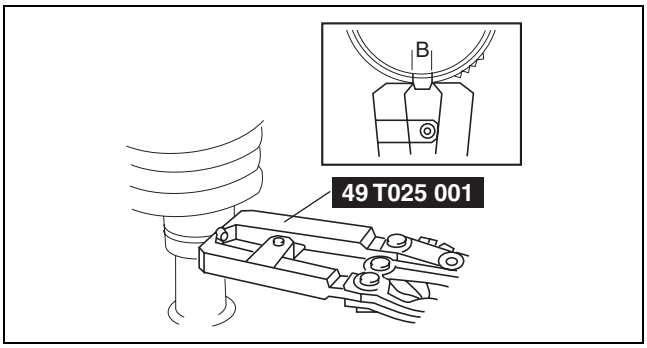
2. Crimp the wheel side small boot band using the **SST**. Verify that clearance B is within the specification.
   - If clearance B is more than the specification, reduce clearance A of the **SST** and crimp the boot again.
   - If clearance B is less than the specification, replace the boot band, increase clearance A of the **SST**, and crimp the new boot.

   **Clearance B**
   **2.4— 2.8 mm {0.095— 0.110 in}**

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3. Verify that the boot band does not protrude from the boot band installation area.
   - If it does, replace the boot band and repeat Steps 2 and 3.
4. Fill the boot with the repair kit grease.
5. Adjust clearance A by turning the adjusting bolt of the **SST**.

   **Clearance A**
   **3.2 mm {0.13 in}**

6. Crimp the wheel side big boot band using the **SST**.
7. Verify that clearance B is within the specification.
   - If clearance B is more than the specification, reduce clearance A of the **SST** and crimp the boot again.
   - If clearance B is less than the specification, replace the boot band, increase clearance A of the **SST** and crimp the new boot.

   **Clearance B**
   **2.4— 2.8 mm {0.095— 0.110 in}**

8. Verify that the boot band does not protrude from the boot band installation area.
   - If it does, replace the boot band and repeat Steps 7 and 8.

# 03-14 DIFFERENTIAL

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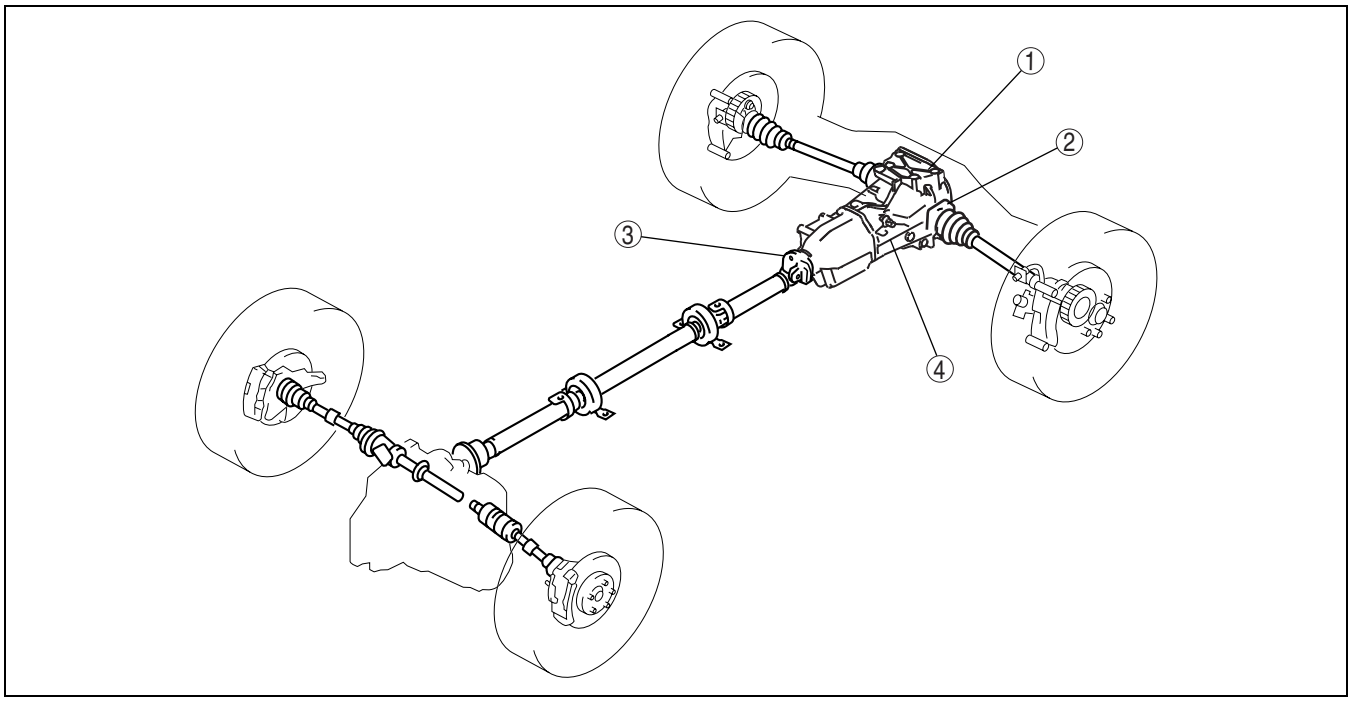


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| | |
|---|---|
| 1 | Differential oil<br>(See 03-14-2 DIFFERENTIAL OIL INSPECTION)<br>(See 03-14-2 DIFFERENTIAL OIL REPLACEMENT) |
| 2 | Oil seal (side gear)<br>(See 03-14-2 OIL SEAL (SIDE GEAR) REPLACEMENT) |

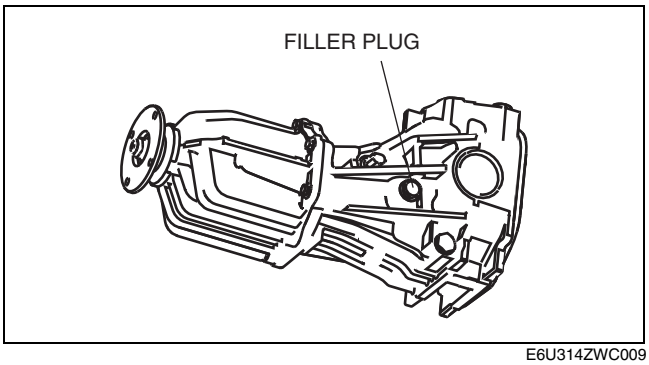
| | |
|---|---|
| 3 | Oil seal (companion flange)<br>(See 03-14-3 OIL SEAL (COMPANION FLANGE) REPLACEMENT) |
| 4 | Rear differential<br>(See 03-14-5 REAR DIFFERENTIAL REMOVAL/INSTALLATION)<br>(See 03-14-6 REAR DIFFERENTIAL DISASSEMBLY)<br>(See 03-14-10 REAR DIFFERENTIAL ASSEMBLY) |

## DIFFERENTIAL OIL INSPECTION

id031400800100

1. Place the vehicle on level ground.
2. Remove the filler plug and washer.
3. Verify that the oil is at the brim of the filler plug hole.
4. If it is low, add the specified oil.
5. Install a new washer and the filler plug, and tighten.

**Tightening torque**
**39.2— 53.9 N·m {4.0— 5.4 kgf·m, 29.0— 39.7 ft·lbf}**

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## DIFFERENTIAL OIL REPLACEMENT

id031400800200

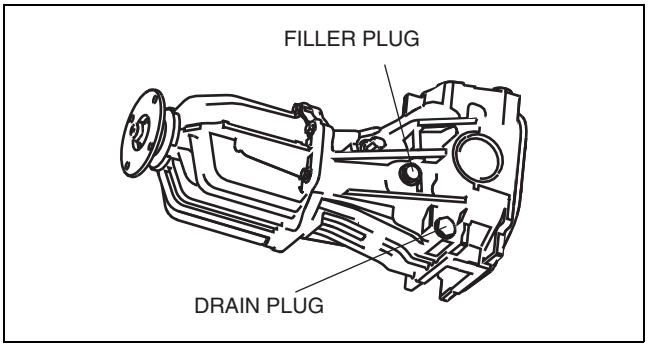
1. Place the vehicle on level ground.
2. Remove the filler plug.
3. Remove the drain plug and drain the differential oil into a container.
4. Install a new washer and the drain plug, and tighten.

**Tightening torque**
**39.2— 53.9 N·m {4.0— 5.4 kgf·m, 29.0— 39.7 ft·lbf}**

5. Add the specified differential oil from the filler plug until the level reaches the brim of the plug hole.

**Rear differential oil type**
**Grade: API service GL-5**
**Viscosity: SAE 80W-90**

**Rear differential oil capacity (approximate quantity)**
**1.00 L {1.06 US qt, 0.88 Imp qt}**

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6. After filling with differential oil, perform oil level inspection.
7. Install a new washer and the drain plug, and tighten.

**Tightening torque**
**39.2— 53.9 N·m {4.0— 5.4 kgf·m, 29.0— 39.7 ft·lbf}**

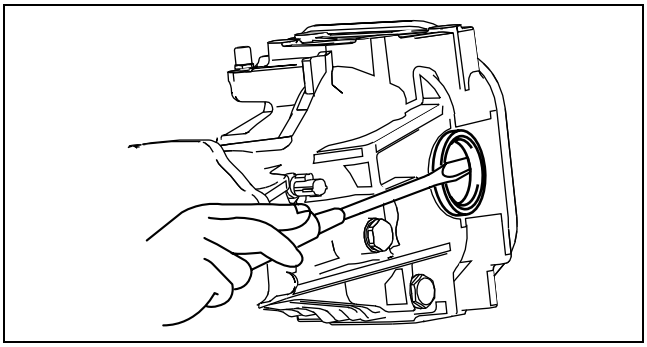
## OIL SEAL (SIDE GEAR) REPLACEMENT

id031400800700

1. Remove the drain plug and the drain differential oil into a container.
2. Install a new washer and the drain plug, and tighten.
3. Remove the rear drive shaft. (See 03-13-20 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
4. Remove the clip from the drive shaft.

**Caution**
- **Wrap the end of a screwdriver with cloth to prevent scratches to the inside of the differential casing.**

5. Remove the oil seal from the differential casing using a screwdriver.
6. Apply differential oil to the new oil seal lip.



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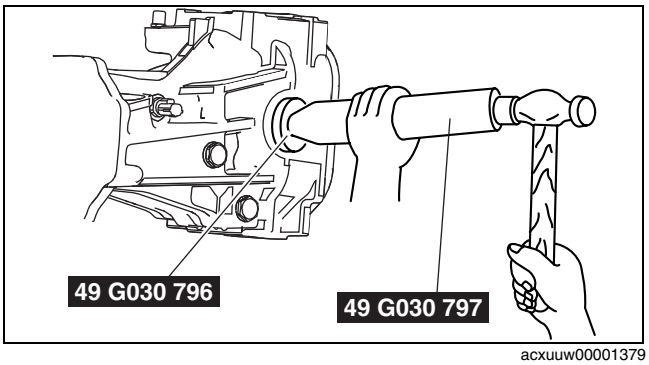
7. Install the new oil seal to the differential carrier using the **SSTs**.
   **Substitution SST**
   - **49 G030 796**
     Outer diameter: 56— 60 mm {2.21— 2.36 in}
     Inner diameter: 49.8 mm {2.0 in} or more
     Inner depth: 8.7 mm {0.34 in} or more
8. After installing the new clip onto the drive shaft, insert the drive shaft into the differential. (See 03-13-20 REAR DRIVE SHAFT REMOVAL/ INSTALLATION.)
9. Verify that the drive shaft cannot be pulled out.
10. Add the specified differential oil.
11. After adding the oil, perform an oil level inspection. (See 03-14-2 DIFFERENTIAL OIL INSPECTION.)
12. Install a new washer and the oil filler plug, and tighten.

    **Tightening torque**
    **39.2— 53.9 N·m {4.0— 5.4 kgf·m, 29.0— 39.7 ft·lbf}**

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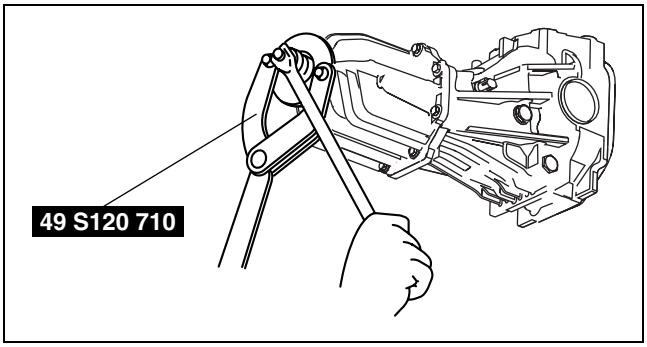
### OIL SEAL (COMPANION FLANGE) REPLACEMENT

id031400800800

1. Drain the differential oil into a container.
2. Remove the propeller shaft. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
3. Remove the locknut using the **SST**.
4. Support the differential using a jack.

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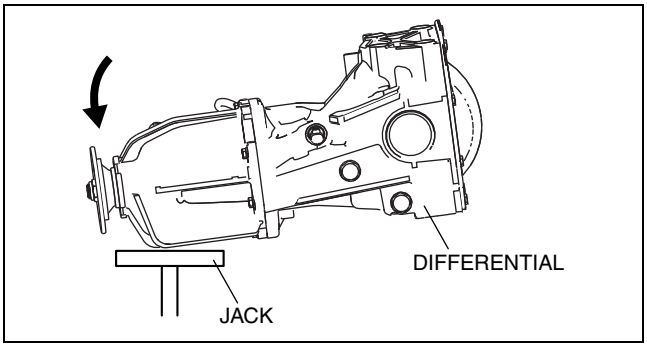
5. After removing the front side of the differential mount, gradually lower the jack and tilt the front side of the differential downward.

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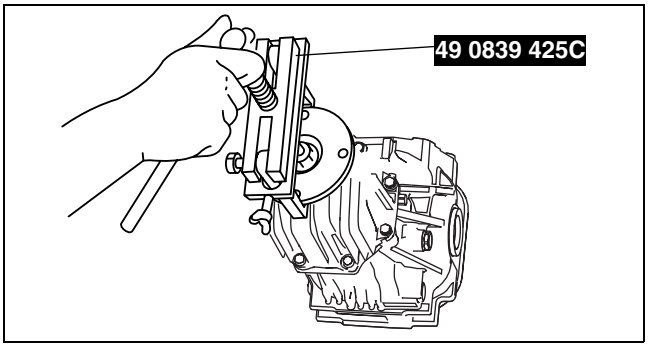
6. Pull the companion flange off using the **SST**.
7. Remove the oil seal from the differential carrier using a screwdriver or similar tool.
8. Apply differential oil to the new oil seal lip.



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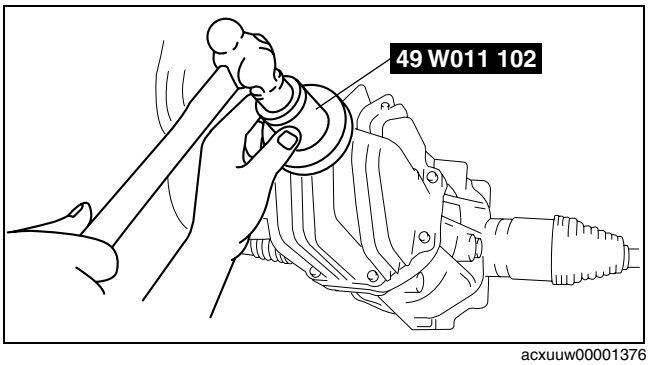
9. Install the new oil seal to the differential carrier using the **SST**.
   **Substitution SST**
   - **49 W011 102**
     Outer diameter: 66 mm {2.60 in} or more
     Inner diameter: 54— 60 mm {2.13— 2.36 in} or more
     Inner depth: 17.5 mm {0.69 in} or more
10. Install the companion flange to the drive pinion.
11. Jack up the differential and install the front side of the differential mount.

    **Tightening torque**
    **75.5— 102 N·m {7.7— 10.4 kgf·m, 55.7— 75.2 ft·lbf}**



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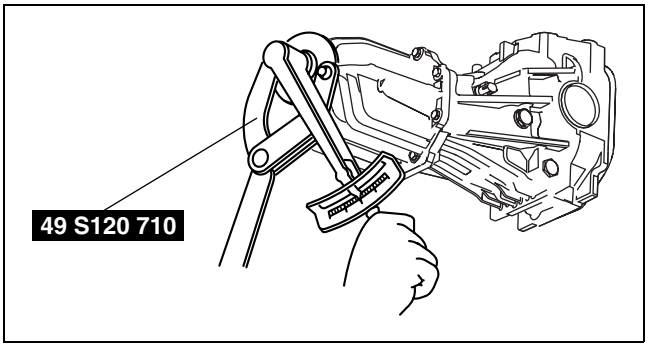
12. Install the washer and a new locknut.
13. Tighten the locknut to the specified torque using the SST.

    **Tightening torque**
    **167— 226 N·m {17.1— 23.0 kgf·m, 124— 166 ft·lbf}**

14. Install the propeller shaft. (See 03-15-3 PROPELLER SHAFT REMOVAL/ INSTALLATION.)
15. Add the specified differential oil from the filler plug. (See 03-14-2 DIFFERENTIAL OIL REPLACEMENT.)



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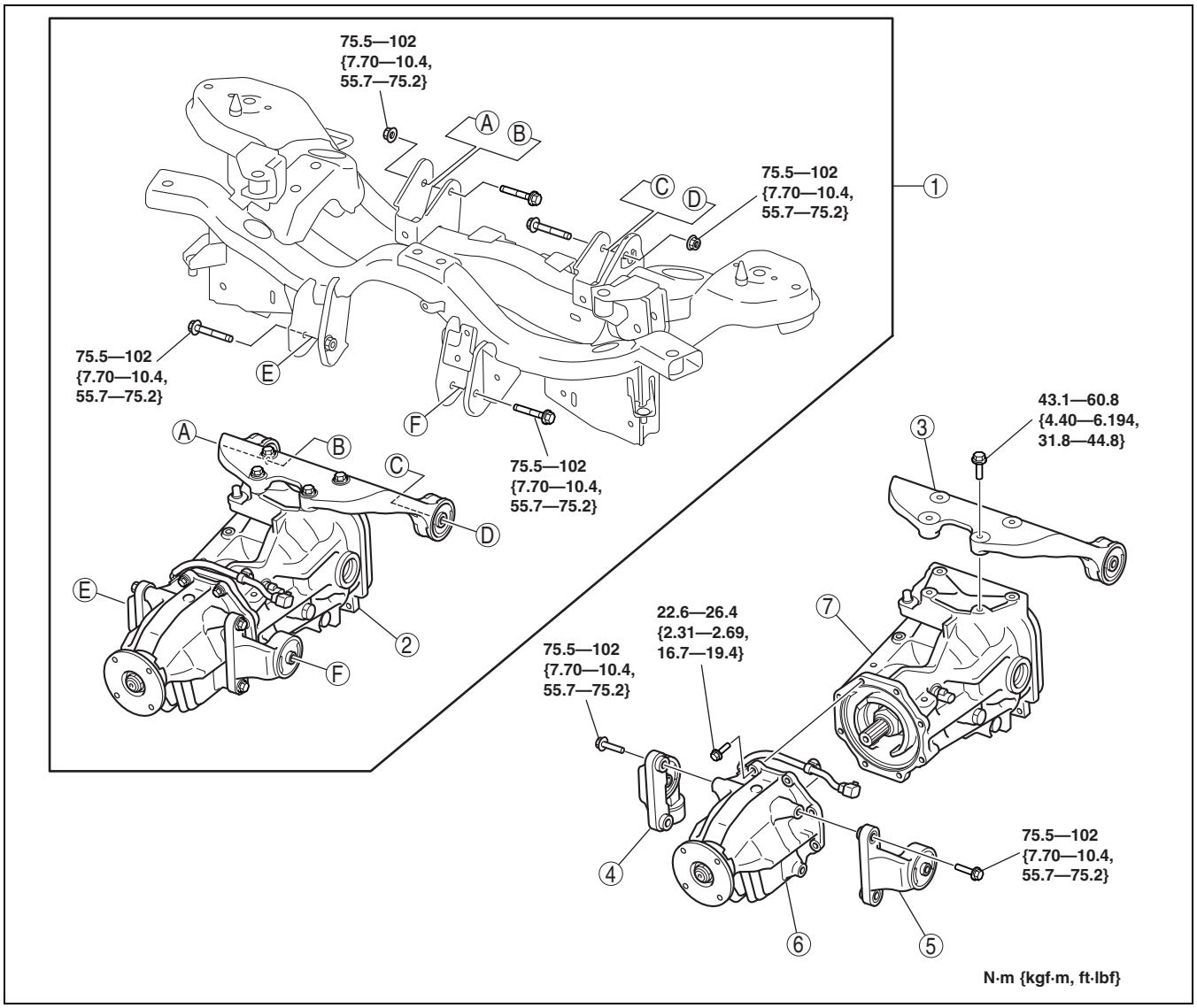
## REAR DIFFERENTIAL REMOVAL/INSTALLATION

id031400800400

1. Drain the rear differential oil into a container.
2. Remove the main silencer and middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the propeller shaft. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove the rear drive shaft. (See 03-13-20 REAR DRIVE SHAFT REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Add the specified rear differential oil. (See 03-14-2 DIFFERENTIAL OIL REPLACEMENT.)
8. Inspect the rear wheel alignment and adjust it if necessary. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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| | |
|---|---|
| 1 | Rear crossmember and rear differential component (See 02-14-20 REAR CROSSMEMBER REMOVAL/INSTALLATION[AWD]) |
| 2 | Rear differential component |
| 3 | Rear differential mounting rubber |
| 4 | Front differential mounting rubber (RH) |

| | |
|---|---|
| 5 | Front differential mounting rubber (LH) |
| 6 | Coupling component (See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION) |
| 7 | Rear differential |

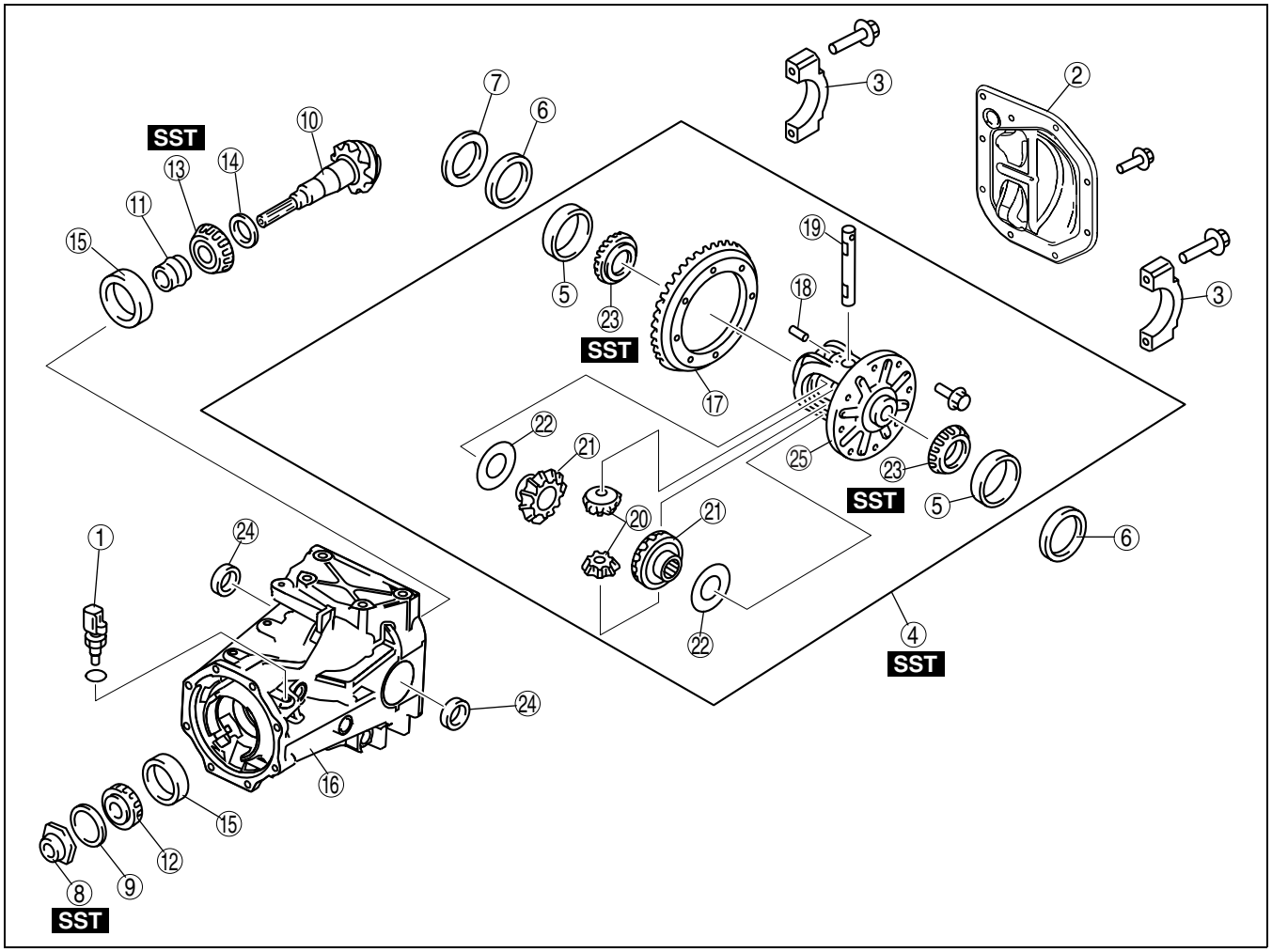
## REAR DIFFERENTIAL DISASSEMBLY

id031400800500

**Warning**

- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is in a tilted condition, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates it could cause injury, therefore do not maintain the rear differential in a tilted condition. When turning the rear differential, grasp the rotation handle firmly.**

1. Disassemble in the order indicated in the table.

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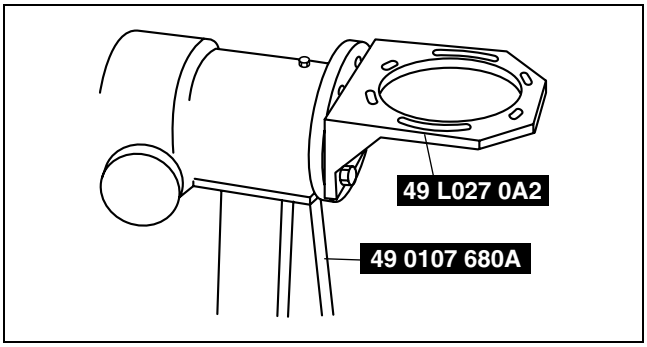
| | |
|---|---|
| 1 | Differential oil temperature sensor |
| 2 | Rear cover<br>(See 03-14-7 Rear Cover Disassembly Note) |
| 3 | Bearing cap<br>(See 03-14-7 Bearing Cap Disassembly Note) |
| 4 | Rear differential component<br>(See 03-14-7 Rear Differential Component Disassembly Note) |
| 5 | Side bearing outer race |
| 6 | Adjusting shim |
| 7 | Spacer |
| 8 | Locknut<br>(See 03-14-8 Locknut Disassembly Note) |
| 9 | Washer |
| 10 | Drive pinion<br>(See 03-14-8 Drive Pinion Disassembly Note) |
| 11 | Collapsible spacer |

| | |
|---|---|
| 12 | Bearing inner race (front bearing) |
| 13 | Bearing inner race (rear bearing)<br>(See 03-14-8 Bearing Inner Race (Rear Bearing) Disassembly Note) |
| 14 | Spacer |
| 15 | Bearing outer race<br>(See 03-14-8 Bearing Outer Race Disassembly Note) |
| 16 | Differential carrier |
| 17 | Ring gear<br>(See 03-14-9 Ring Gear Disassembly Note) |
| 18 | Knock pin |
| 19 | Pinion shaft |
| 20 | Pinion gear |
| 21 | Side gear |
| 22 | Thrust washer |

| | |
|---|---|
| 23 | Side bearing inner race<br>(See 03-14-9 Side Bearing Inner Race Disassembly Note) |
| 24 | Oil seal |
| 25 | Gear case |

**Rear Cover Disassembly Note**

1. Install the **SSTs** to the engine stand.

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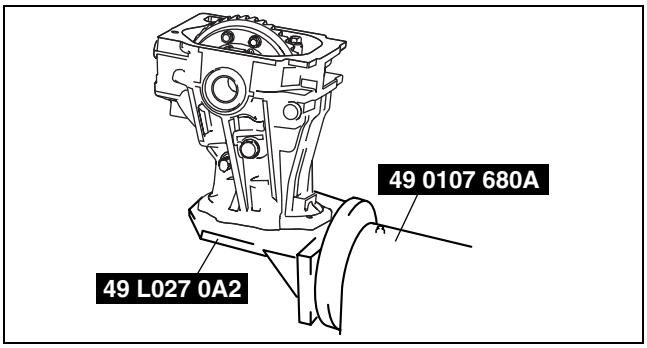
2. Install the rear differential to the **SSTs**.
3. Remove the rear cover using an oil seal cutter.

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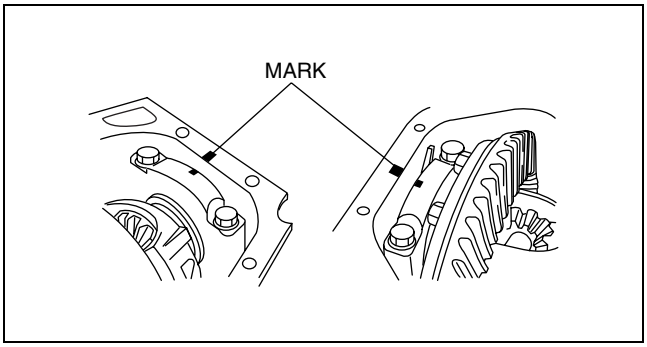
**Bearing Cap Disassembly Note**

1. Place alignment marks on the bearing cap and carrier.

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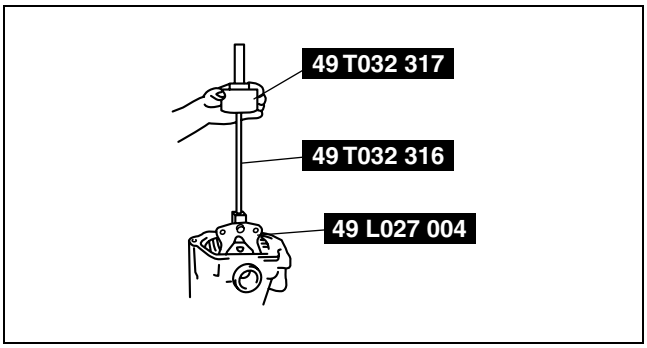
**Rear Differential Component Disassembly Note**

1. Remove the rear differential component using the **SSTs**.
2. Mark or otherwise distinguish between the removed left and right adjusting shims, spacers and side bearing outer races so that they are not mixed up at the time of reassembly.

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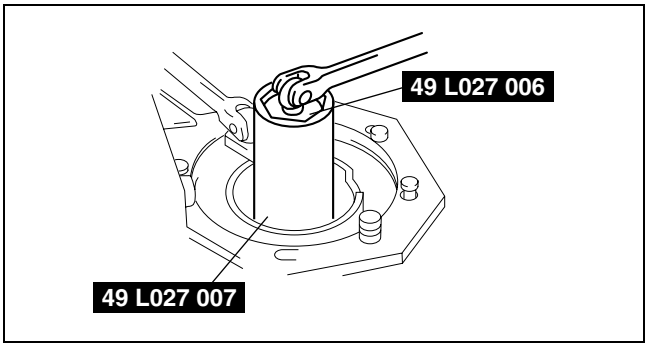
**Locknut Disassembly Note**

1. Remove the locknut using the **SSTs**.

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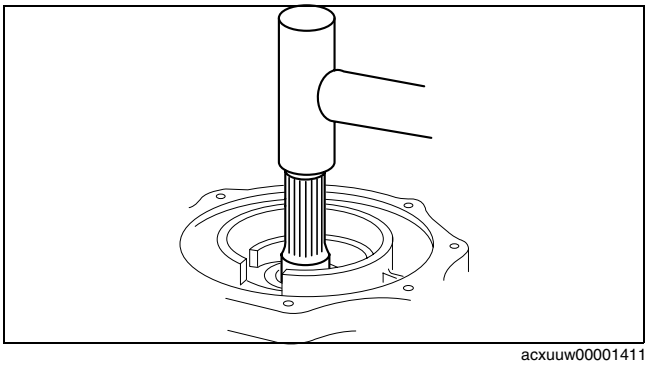
**Drive Pinion Disassembly Note**

1. Remove the drive pinion by lightly tapping with a copper hammer.



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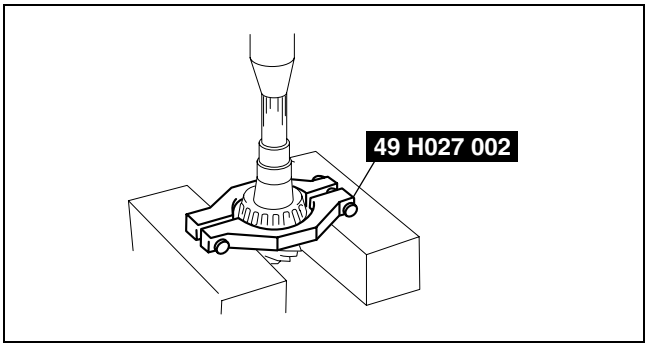
**Bearing Inner Race (Rear Bearing) Disassembly Note**

1. Remove the bearing inner races (rear bearing) using the **SST** and a press.

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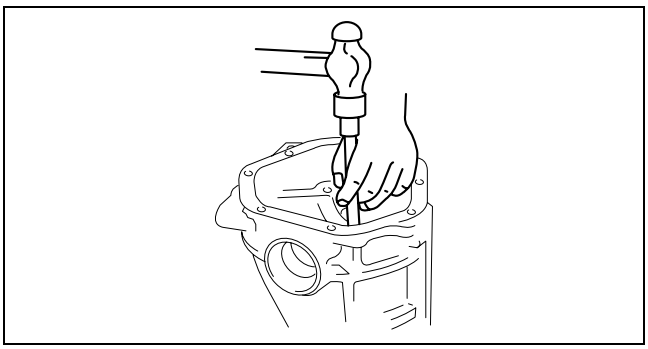
**Bearing Outer Race Disassembly Note**

1. Remove the bearing outer races using the 2 grooves in the carrier and alternately tapping the sides of the races with a brass bar.



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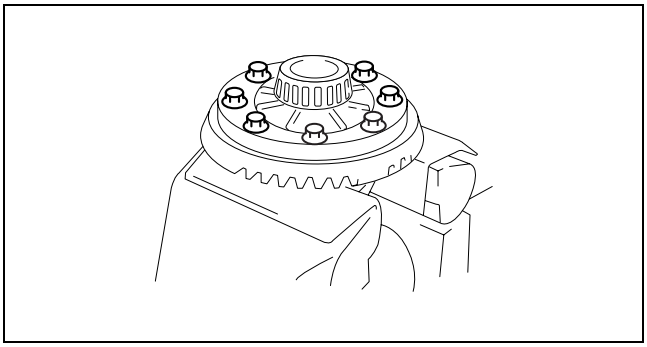
**Ring Gear Disassembly Note**

1. Secure the gear case in a vice and remove the bolts.
2. Lightly tap around the ring gear using a plastic hammer to remove the ring gear from the gear case.



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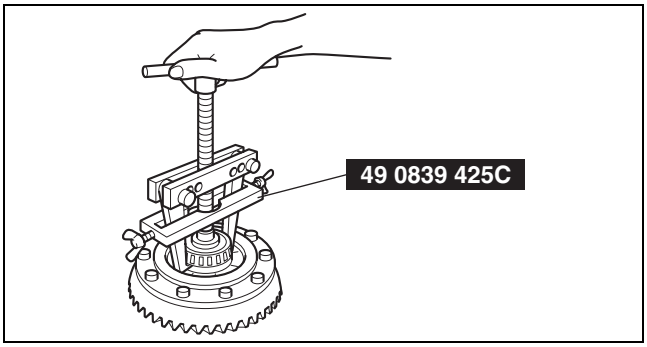
**Side Bearing Inner Race Disassembly Note**

**Note**

- Mark or otherwise distinguish between the left and right side bearings so that they are not mixed up at the time of reassembly.

1. Remove the side bearing inner races from the gear case using the **SST** and a press.

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## REAR DIFFERENTIAL ASSEMBLY

id031400800600

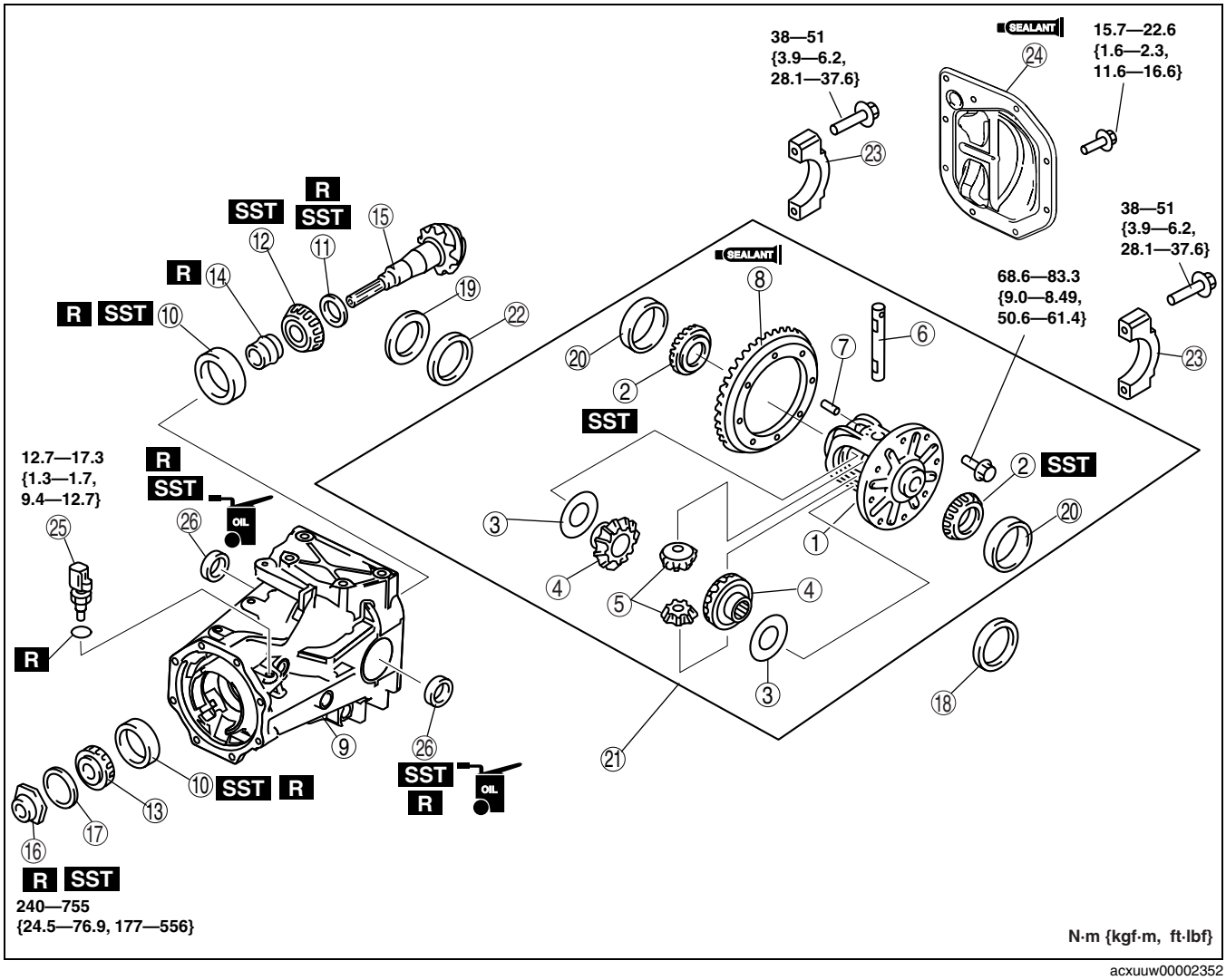
**Warning**

- **The engine stand is equipped with a self-lock mechanism, however, if the rear differential is in a tilted condition, the self-lock mechanism could become inoperative. If the rear differential unexpectedly rotates it could cause injury, therefore do not maintain the rear differential in a tilted condition. When turning the rear differential, grasp the rotation handle firmly.**

**Note**

- Clean away the old sealant before applying the new sealant.
- Install the rear cover within **10 minutes** after applying sealant.
- Allow the sealant to set at least **30 minutes** after installation before filling the differential with the specified oil.

1. Assemble in the order indicated in the table.

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| | |
|---|---|
| 1 | Gear case |
| 2 | Side bearing inner race<br>(See 03-14-11 Side Bearing Inner Race Assembly Note) |
| 3 | Thrust washer<br>(See 03-14-11 Thrust washer Assembly Note) |
| 4 | Side gear |
| 5 | Pinion gear |
| 6 | Pinion shaft |
| 7 | Knock pin |

| | |
|---|---|
| 8 | Ring gear<br>(See 03-14-12 Ring Gear Assembly Note) |
| 9 | Differential carrier |
| 10 | Bearing outer race<br>(See 03-14-12 Bearing Outer Race Assembly Note) |
| 11 | Spacer<br>(See 03-14-13 Spacer, Bearing Inner Race Assembly Note) |
| 12 | Bearing inner race (rear bearing)<br>(See 03-14-13 Spacer, Bearing Inner Race Assembly Note) |

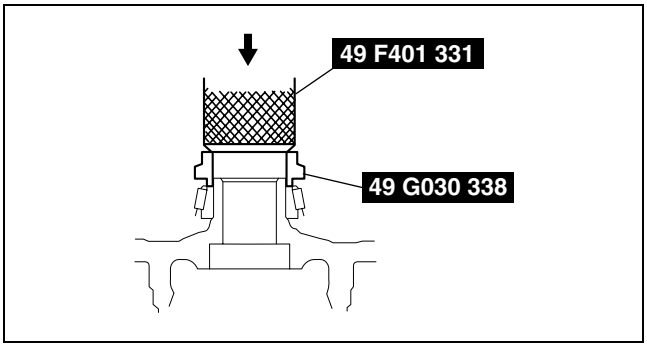
| | |
|---|---|
| 13 | Bearing inner race (front bearing)<br>(See 03-14-13 Spacer, Bearing Inner Race Assembly Note) |
| 14 | Collapsible spacer |
| 15 | Drive pinion |
| 16 | Locknut<br>(See 03-14-15 Locknut Assembly Note) |
| 17 | Washer |
| 18 | Adjusting shim (L)<br>(See 03-14-15 Adjusting Shim Assembly Note) |
| 19 | Spacer |
| 20 | Side bearing outer race |
| 21 | Rear differential component |
| 22 | Adjusting shim (R) |
| 23 | Bearing cap<br>(See 03-14-17 Bearing Cap Assembly Note) |
| 24 | Rear cover<br>(See 03-14-18 Rear Cover Assembly Note) |
| 25 | Differential oil temperature sensor |
| 26 | Oil seal<br>(See 03-14-18 Oil Seal Assembly Note) |



**Side Bearing Inner Race Assembly Note**

**Caution**
- **Do not mix up the left and right side bearing inner races.**

1. Press the side bearing inner races into the gear case using the **SSTs**.
   **Substitution SST**
   - **49 G030 338**
     Outer diameter: 43— 45 mm {1.70— 1.77 in}
     Inner diameter: 41 mm {1.61 in} or more
     Inner depth: 3 mm {0.12 in} or more



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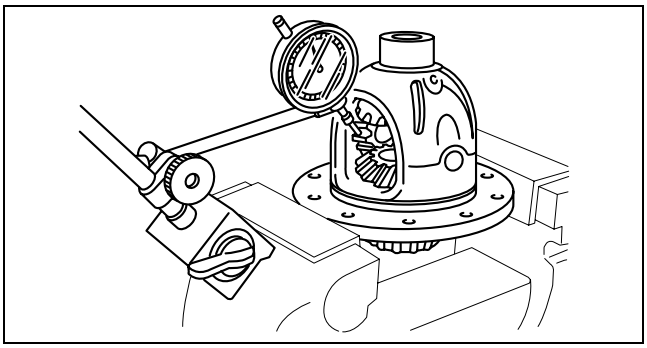
**Thrust washer Assembly Note**
1. Assemble the side gears, thrust washers and pinion gears to the gear case, then assemble the knock pin.
2. After assembling the knock pin, make a crimp so that the pin will not come out of the gear case.
3. Set a dial gauge to the pinion gear as indicated in the figure.
4. Secure one of the side gears.
5. Move the pinion gear and measure the backlash at the end of the pinion gear.
   - If the backlash exceeds the standard, use the thrust washers to adjust.

**Standard backlash**
**0.1 mm {0.004 in} or less**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**Thrust washer thickness**

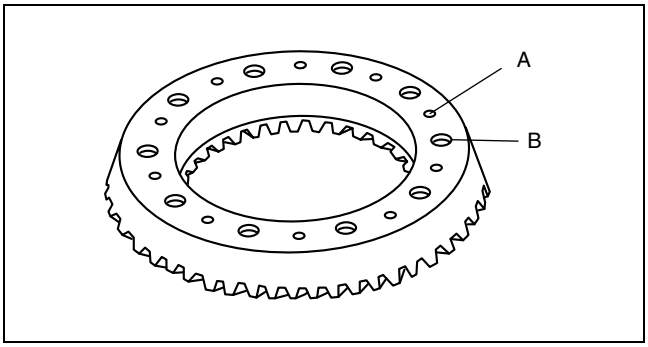
| Identification mark | Thickness |
|---|---|
| 0 | 2.0 mm {0.079 in} |
| 1 | 2.1 mm {0.083 in} |
| 2 | 2.2 mm {0.086 in} |
| 05 | 2.05 mm {0.081 in} |
| 15 | 2.15 mm {0.084 in} |

**Ring Gear Assembly Note**

**Caution**
- **The differential gear and ring gear could be damaged if the ring gear is installed with old thread-locking compound remaining on the bolt threads. Before installing the ring gear, completely remove the old thread-locking compound from the bolt threads.**

1. Apply a small amount of thread-locking compound to each of points A on the back of the ring gear, and bolt thread areas B (around the entire ring).

   **Application amount**
   **Back of ring gear:**
   **Approx. 0.4 ml {0.4 cc, 0.02 cu in}**
   **Ring gear bolt thread points:**
   **Approx. 0.4 ml {0.4 cc, 0.02 cu in}**
   **(0.04 ml {0.04 cc, 0.002 cu in} to each point)**



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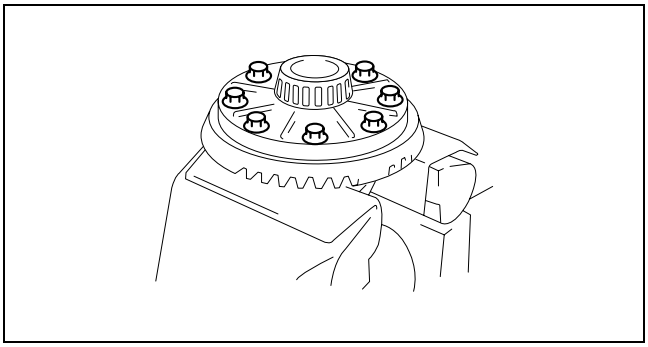
2. Align the marks placed on the ring gear case at the time of disassembly and tighten the bolts in diagonal order.

   **Tightening torque**
   **68.6— 83.3 N·m {7.00— 8.49 kgf·m, 50.6— 61.4 ft·lbf}**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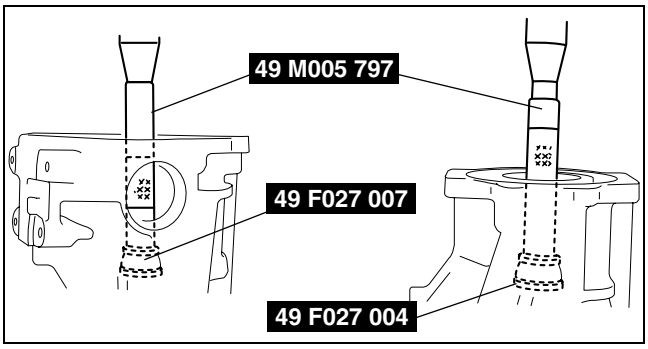
**Bearing Outer Race Assembly Note**

1. Press in the bearing outer race using the **SSTs** and a press.
   **Substitution SST**
   - **49 F027 007**
     Outer diameter: 70.8— 71.0 mm {2.78— 2.79 in}
     Plate thickness: 1 mm {0.04 in} or more
   - **49 F027 004**
     Outer diameter: 78.5— 79.0 mm {3.10— 3.11 in}
     Plate thickness: 1 mm {0.04 in} or more



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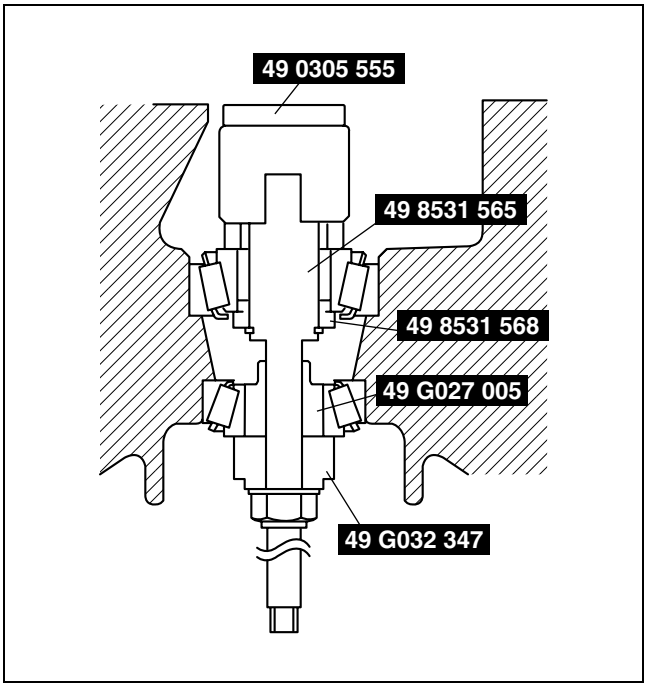
**Spacer, Bearing Inner Race Assembly Note**
**Pinion height adjustment**

**Note**
- Use the same spacer.
- Install the spacer with the chamfer on the **SST** side.

1. Assemble the spacer, the bearing inner race (rear bearing), and the **SST** O-ring to the **SST** (49 8531 565) as shown in the figure.
2. Insert the set assembled in Step 1 to the differential gear from the rear.
3. Assemble the bearing inner race (front bearing), **SST** (49 G027 005), companion flange, washer, and locknut from the front of the differential gear.
4. Tighten the locknut to the extent that the **SST** (49 8531 565) can be turned by hand.
5. Place the **SST** (49 0305 555) on top of the **SST** (49 8531 565).



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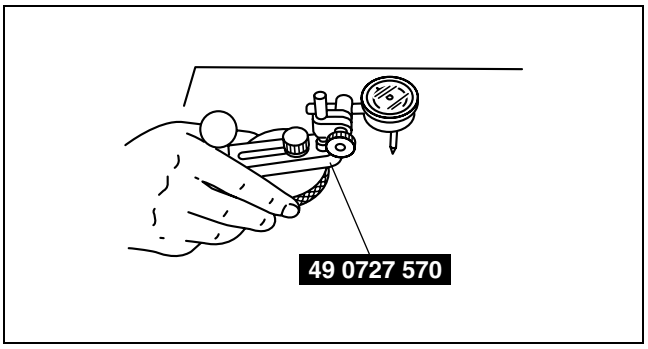
6. Place the **SST** on the surface plate and set the dial indicator to zero.



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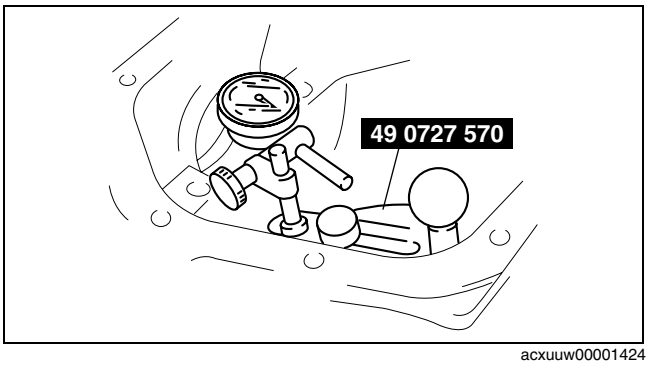
7. Set the **SST** as shown in the figure.
8. Place the measuring probe of the dial indicator so that it contacts the place where the side bearing is installed in the carrier. Then measure the left and right side of the lower position.



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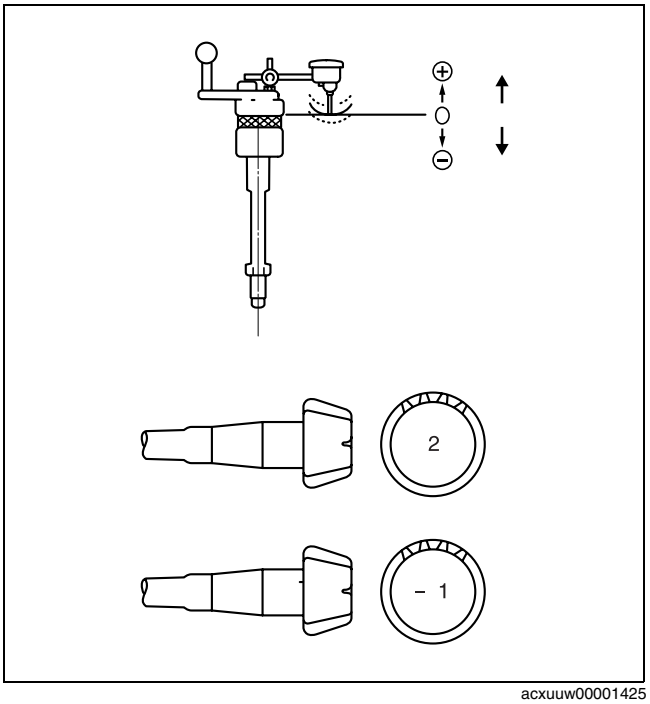
9. Add the two (left and right) values obtained by the measurements taken in Step 8 and then divide the total by 2. From this result, subtract the result obtained by dividing the number inscribed on the end surface of the drive pinion by 100. (If there is no figure inscribed, use 0.) This is the pinion height adjustment value.

   **Rear differential pinion height**
   **–0.032— 0.032 mm {–0.0012— 0.0012 in}**

   **Note**
   - For example, the measured results obtained at Step 8 and 9 are 0.06 mm {0.003 in} and 0.04 mm {0.002 in}, and the figure inscribed on the end of the drive pinion is 2:
     ((0.06 mm {0.003 in}+ 0.04 mm {0.002 in}) / 2) – (2/100) = 0.03 mm {0.001 in} (pinion height adjustment value)
     Replace with a spacer 0.03 mm {0.001 in} thicker than the currently used one. Spacer thickness is set at 0.015 mm {0.0006 in} increments, therefore select the closest spacer thickness and assemble.
   - Install the spacer with the chamfer on the **SST** side.



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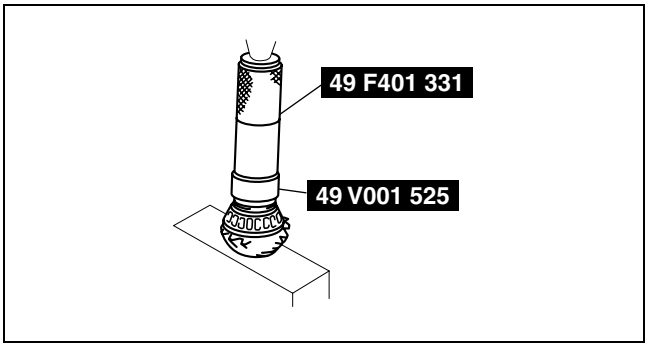
**Spacer thickness**

| Identification mark | Thickness (mm {in}) | Identification mark | Thickness (mm {in}) |
|---|---|---|---|
| 08 | 3.08 {0.1213} | 29 | 3.29 {0.1295} |
| 09 | 3.095 {0.1219} | 30 | 3.305 {0.1301} |
| 11 | 3.11 {0.1224} | 32 | 3.32 {0.1307} |
| 12 | 3.125 {0.1230} | 33 | 3.335 {0.1313} |
| 14 | 3.14 {0.1236} | 35 | 3.35 {0.1319} |
| 15 | 3.155 {0.1242} | 36 | 3.365 {0.1325} |
| 17 | 3.17 {0.1248} | 38 | 3.38 {0.1331} |
| 18 | 3.185 {0.1254} | 39 | 3.395 {0.1337} |
| 20 | 3.20 {0.1260} | 41 | 3.41 {0.1343} |
| 21 | 3.215 {0.1266} | 42 | 3.425 {0.1348} |
| 23 | 3.23 {0.1272} | 44 | 3.44 {0.1354} |
| 24 | 3.245 {0.1278} | 45 | 3.455 {0.1360} |
| 26 | 3.26 {0.1283} | 47 | 3.47 {0.1366} |
| 27 | 3.275 {0.1289} | — | — |

10. Assemble the spacer selected for the pinion height adjustment to the drive pinion.
11. Press the bearing inner race (rear bearing) into the drive pinion using the **SSTs** and a press.
    **Substitution SST**
    - **49 V001 525**
      Outer diameter: 37.2— 50.3 mm {1.47— 1.98 in}
      Inner diameter: 35.2 mm {1.39 in} or more
      Inner depth: 134.3 mm {5.29 in} or more
      Plate thickness: 1 mm {0.04 in} or more



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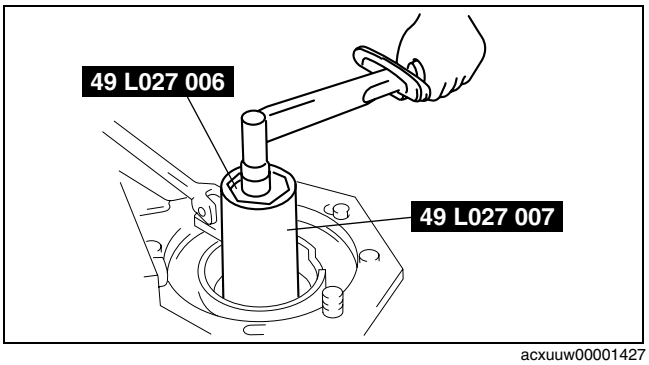
**Locknut Assembly Note**
**Drive pinion preload adjustment**

1. Apply differential oil to a new locknut.
2. Assemble a new collapsible spacer, bearing inner race (front bearing), spacer and locknut to the drive pinion, and temporarily tighten the locknut.
3. Turn the serrated part of the drive pinion by hand to seat the bearing.
4. Tighten the locknut temporarily tightened in Step 1 from the lower limit of the specified tightening torque using the **SSTs**, and make this the specified preload.
   - If the specified preload cannot be obtained within the specified tightening torque, replace the collapsible spacer and inspect again.

   **Tightening torque**
   **167— 226 N·m {17.1— 23.0 kgf·m, 124— 166 ft·lbf}**

   **Rear differential drive pinion preload**
   **1.3— 1.8 N·m {13.3— 18.2 kgf·cm, 11.5— 15.9 in·lbf}**



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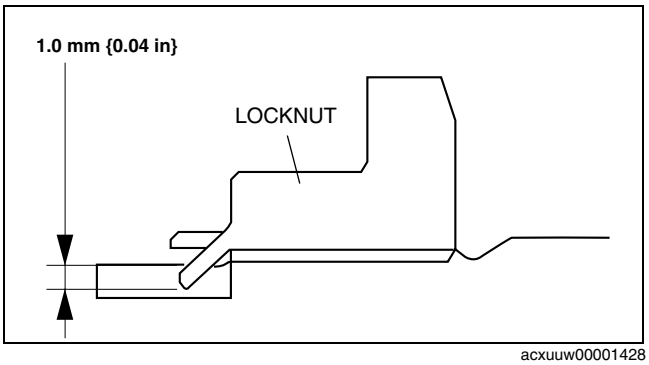
5. Crimp the locknut using a chisel and hammer.



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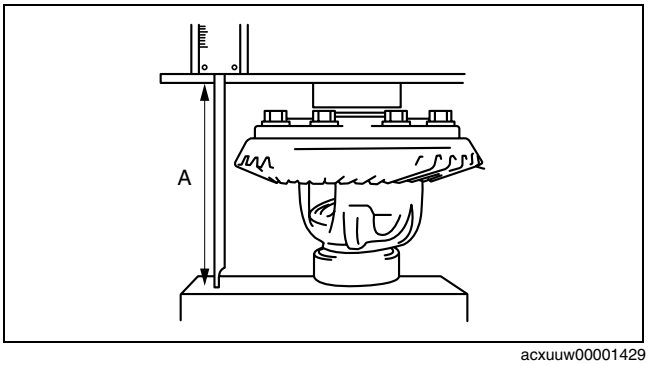
**Adjusting Shim Assembly Note**

1. Assemble the differential carrier to the **SSTs**.
2. Assemble the spacer to the differential carrier.
3. Stack the side bearing outer race and gear case component on the surface plate as indicated in the figure, and measure the height using a caliper and a ruler. This is value A.



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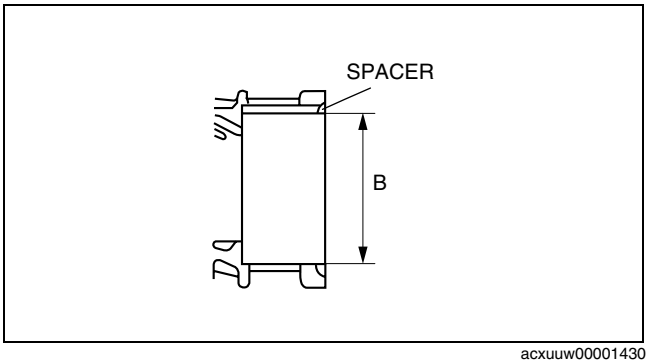
4. Measure the width of the installed differential in the differential carrier with the spacer installed. This is value B.
5. The combined thickness of the left and right adjusting shims is obtained by the following formula.
   **$C_1$ = B – A + 0.15 mm {0.006 in}**
   **$C_2$ = B – A + 0.44 mm {0.017 in}**
6. If the combined thickness of the previously installed adjusting shims is between C1 and C2, use the shims as they are.



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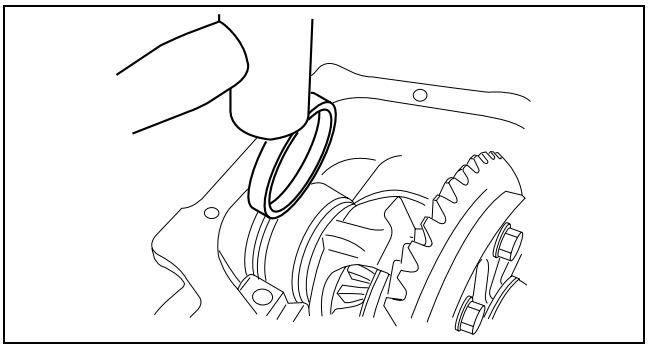
7. If the combined thickness of the previously installed adjusting shims is not between C1 and C2, or if the adjusting shims have to be replaced, select two appropriate adjusting shims from the table below.

**Adjusting shim thickness**

| Identification mark | Thickness (mm {in}) | Identification mark | Thickness (mm {in}) |
|---|---|---|---|
| 350 | 3.50 {0.137} | 410 | 4.10 {0.161} |
| 355 | 3.55 {0.139} | 415 | 4.15 {0.163} |
| 360 | 3.60 {0.141} | 420 | 4.20 {0.165} |
| 365 | 3.65 {0.143} | 425 | 4.25 {0.167} |
| 370 | 3.70 {0.145} | 430 | 4.30 {0.169} |
| 375 | 3.75 {0.147} | 435 | 4.35 {0.171} |
| 380 | 3.80 {0.149} | 440 | 4.40 {0.173} |
| 385 | 3.85 {0.151} | 445 | 4.45 {0.175} |
| 390 | 3.90 {0.153} | 450 | 4.50 {0.177} |
| 395 | 3.95 {0.155} | 455 | 4.55 {0.179} |
| 400 | 4.00 {0.157} | 460 | 4.60 {0.181} |
| 405 | 4.05 {0.159} | — | — |

**Caution**
- **If adjusting shims are to be reused, do not mix up the left and right shims.**
- **Do not mix up the left and right side bearing outer races and spacers.**

8. Assemble the selected adjusting shims to the differential carrier ring gear side, and the spacer to the opposite side.
9. Assemble the differential and bearing outer race to the differential carrier.
10. Tap the selected adjusting shim between the spacer and the bearing race with a plastic hammer as shown in the figure.
11. Align the bearing cap alignment marks to assemble the bearing cap, and temporarily tighten the bolts.
12. Place the dial indicator so that the measuring probe contacts the top surface of one of the ring gear teeth perpendicularly.
13. Secure the drive pinion and measure the backlash from when the ring gear moved.



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**Rear differential backlash of drive pinion and ring gear**
**Standard: 0.09— 0.11 mm {0.003— 0.004 in}**
**Minimum value: 0.05 mm {0.002 in}**

**Note**
- Measure the backlash at 4 locations around the ring gear. Make sure one of the 4 locations is within specification, and the minimum value for the 4 locations is **0.5 mm {0.002 in}** or less.

14. If the backlash is not within the specification, adjust the gear case component by moving it in the axial direction.

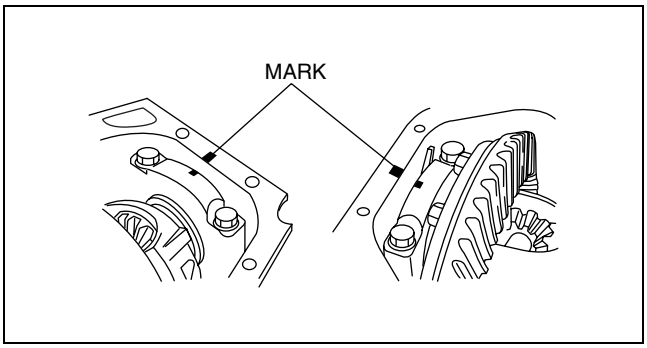
**Note**
- When moving the gear case component in the axial direction, replace the adjusting shims. If the adjusting shim on the right side is replaced with one that is **0.05 mm {0.002 in}** thicker, replace the one on the left with one that is **0.05 mm {0.002 in}** thinner.

**Bearing Cap Assembly Note**

1. Align the bearing cap alignment marks to assemble the bearing cap.

   **Tightening torque**
   **38— 51 N·m {3.9— 5.2 kgf·m, 28.1— 37.0 ft·lbf}**

2. Inspect the drive pinion and ring gear teeth contact points.

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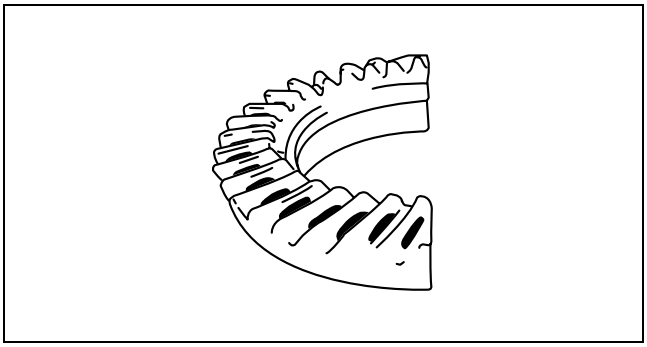
   (1) Coat both surfaces of the ring gear uniformly with a thin red lead coating.
   (2) While rotating the ring gear back and forth by hand, rotate the drive pinion several times and inspect the tooth contact.
   (3) Inspect the tooth contacts in four locations around the ring gear, and check that the tooth contacts showing the red lead coating are the same as the pattern indicated in the figure.
      - If the tooth contact is good, wipe off the red lead coating.
      - If it is not good, adjust the pinion height, then adjust the backlash.



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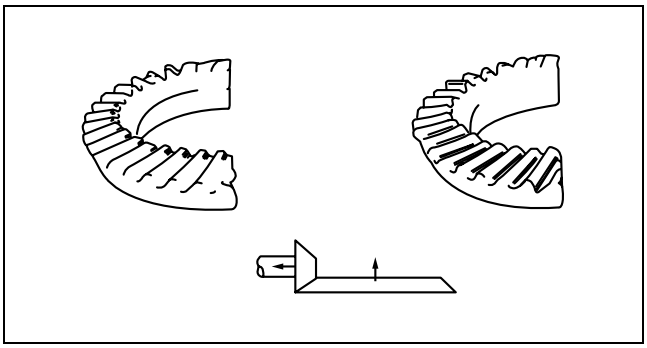
   (4) If toe and flank contact appears as shown in the figure, replace the spacer with a thinner one, and move the drive pinion outward.



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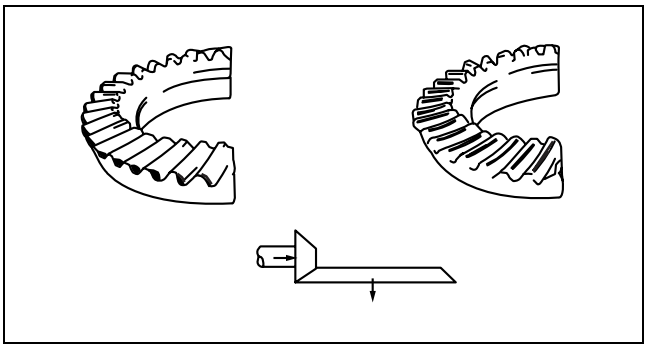
   (5) If heel and face contact appears as indicated in the figure, replace the spacer with a thicker one and move the drive the pinion inward.



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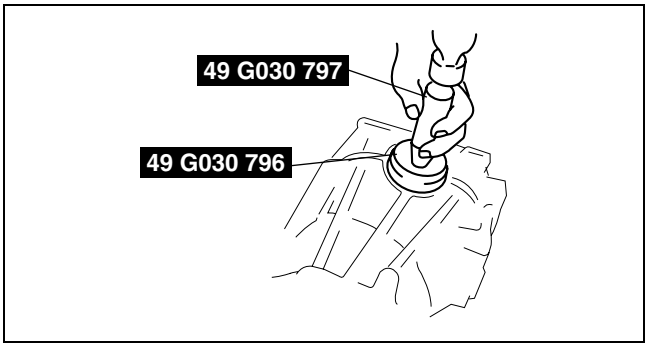
**Rear Cover Assembly Note**

**Caution**
- **Clean away the old sealant before applying the new sealant.**
- **Install the rear differential within 10 minutes after applying sealant.**
- **Allow the sealant to set at least 30 minutes after installation before filling the differential with the specified oil.**

1. Clean the alignment surface of the carrier and rear cover, and apply a thin coat of sealant.
2. Install the rear cover.

**Tightening torque**
**15.7— 22.6 N·m {1.6— 2.3 kgf·m, 11.6— 16.6 ft·lbf}**

**Oil Seal Assembly Note**
1. Apply differential oil to the new oil seal lip.
2. Assemble the oil seal using the **SSTs**.
   **Substitution SST**
   - **49 G030 796**
     Outer diameter: 56— 60 mm {2.21— 2.36 in}
     Inner diameter: 49.8 mm {1.96 in} or more
     Inner depth: 8.7 mm {0.34 in} or more



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# 03-15 PROPELLER SHAFT

**PROPELLER SHAFT**
**LOCATION INDEX. . . . . 03-15–1**
**PROPELLER SHAFT**
**ON-VEHICLE INSPECTION . . . . . 03-15–2**
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Propeller Shaft Runout Inspection . . . . **03-15–2**
**PROPELLER SHAFT**
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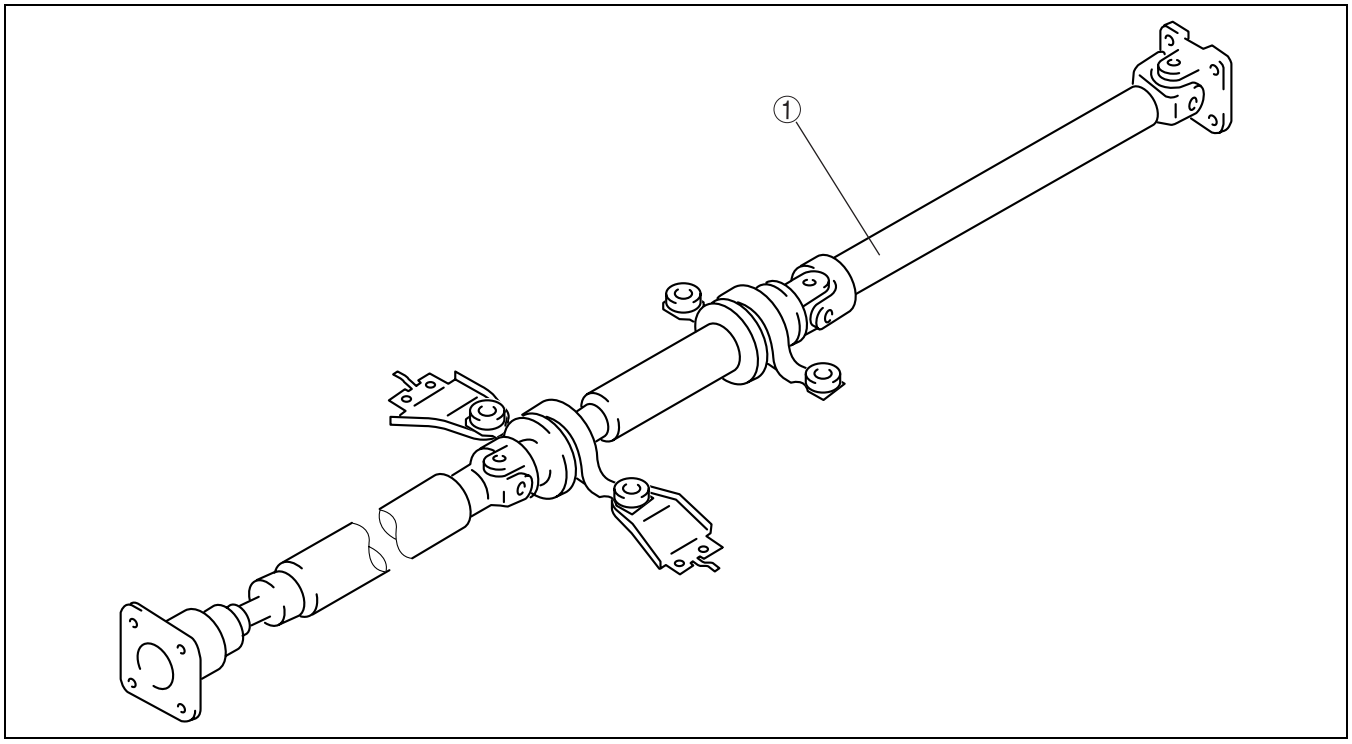
Bolt and Nut Removal Note. . . . . **03-15–4**
Propeller Shaft Installation Note . . . . . **03-15–4**
**PROPELLER SHAFT INSPECTION . . . . 03-15–5**

## PROPELLER SHAFT LOCATION INDEX

id031500800100



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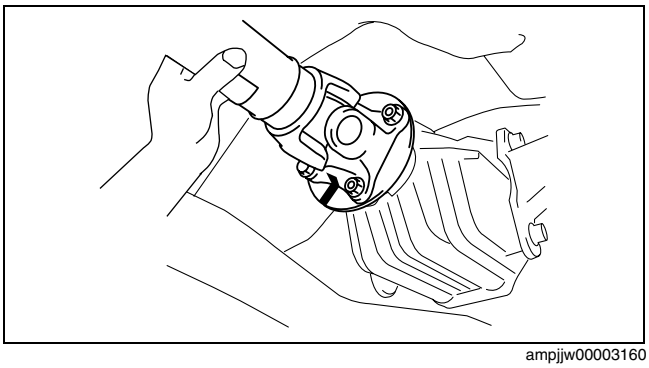
| | |
|---|---|
| 1 | Propeller shaft<br>(See03-15-2 PROPELLER SHAFT ON-VEHICLE INSPECTION.)<br>(See03-15-3 PROPELLER SHAFT REMOVAL/ INSTALLATION.)<br>(See03-15-5 PROPELLER SHAFT INSPECTION.) |

## PROPELLER SHAFT ON-VEHICLE INSPECTION

id031500800200

### Joint Area Excessive Play Inspection

1. Shake the universal joint by hand and verify that there is no excessive play.
2. If there is any excessive play, replace the propeller shaft. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)



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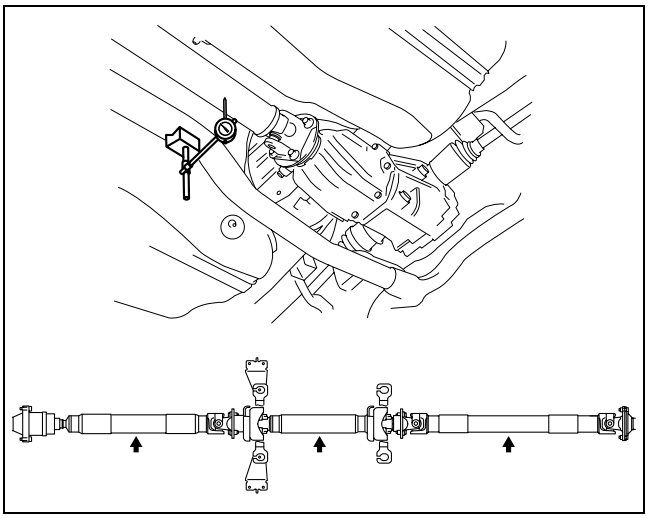
### Propeller Shaft Runout Inspection

**Caution**

- **Do not rotate the propeller shaft using engine force when inspecting.**

1. Shift to neutral position and release the parking brake.
2. Rotate the rear wheel by hand and inspect the propeller shaft runout at the three locations shown in the figure.
   - If it exceeds the standard specification, replace the propeller shaft.

**Standard propeller shaft runout (on-vehicle)**
**0.8 mm {0.031 in}**



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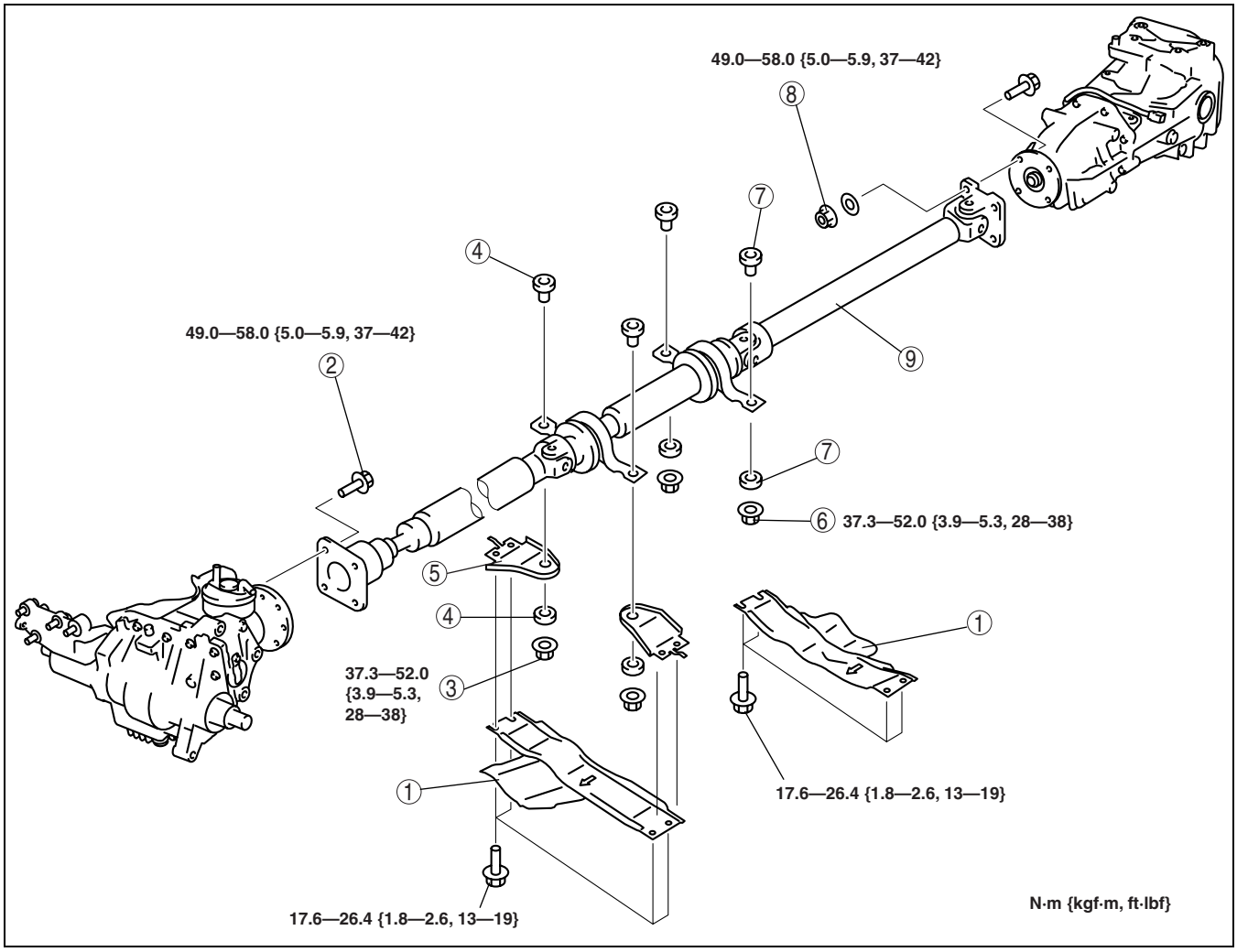
## PROPELLER SHAFT REMOVAL/INSTALLATION

id031500800300

1. Remove the negative battery cable.
2. Remove the middle pipe, and front pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove in the order indicated in the figure.
4. Install in the reverse order of removal.

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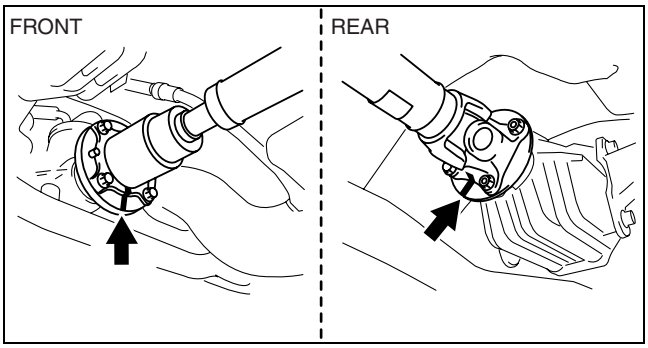
| | |
|---|---|
| 1 | Balk head plate |
| 2 | Bolt<br>(See03-15-4 Bolt and Nut Removal Note.) |
| 3 | Nut |
| 4 | Bush, spacer |
| 5 | Bracket |

| | |
|---|---|
| 6 | Nut |
| 7 | Bush, spacer |
| 8 | Nut<br>(See03-15-4 Bolt and Nut Removal Note.) |
| 9 | Propeller shaft<br>(See03-15-4 Propeller Shaft Installation Note.) |

**Bolt and Nut Removal Note**

**Caution**
- **Do not mark with a punch to prevent imbalance.**

1. Before removing the nut, place alignment marks on the companion flange (front) and constant velocity joint, and on the companion flange (rear) and yoke.



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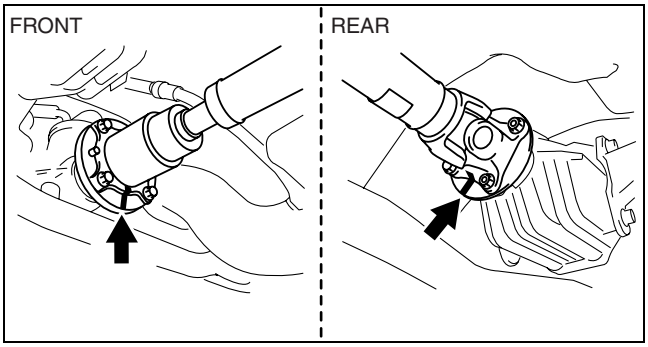
**Propeller Shaft Installation Note**

1. Align the alignment marks and install the propeller shaft.



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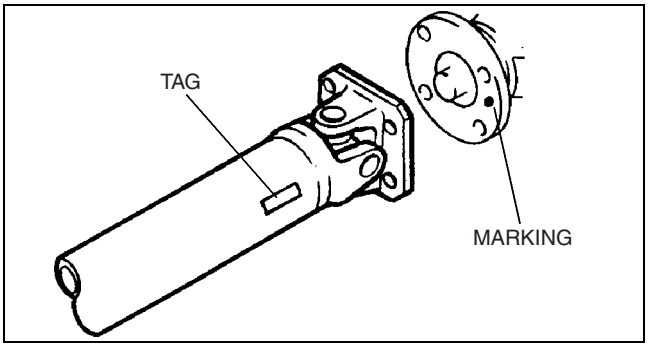
2. When installing a new propeller shaft, align the rear differential companion flange mark with the tag on the propeller shaft so that they are at the nearest position, and assemble.
3. Perform a road test and verify that there is no abnormal vibration or noise.



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## PROPELLER SHAFT INSPECTION

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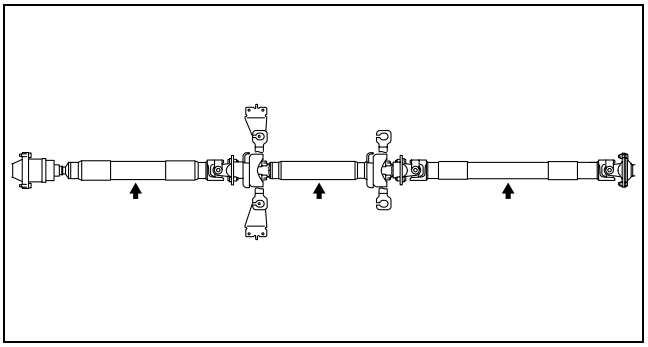
1. Measure the propeller shaft center runout using the dial gauge.
   - If it exceeds the maximum specification, replace the propeller shaft as a single component.

   **Maximum propeller shaft runout**
   **0.8 mm {0.031 in}**



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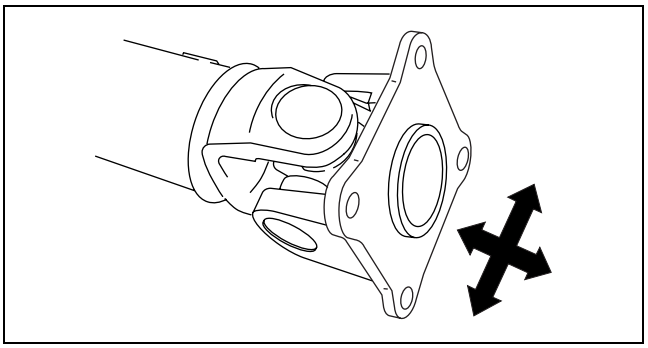
2. Inspect the play and rotation of the joint by turning the universal joint in the directions shown by the arrows.
   - If it is not within the specification, replace the propeller shaft.

   **Propeller shaft starting torque**
   **0.29— 1.47 N·m {3.0— 14.9 kgf·cm, 2.6— 13.0 in·lbf}**



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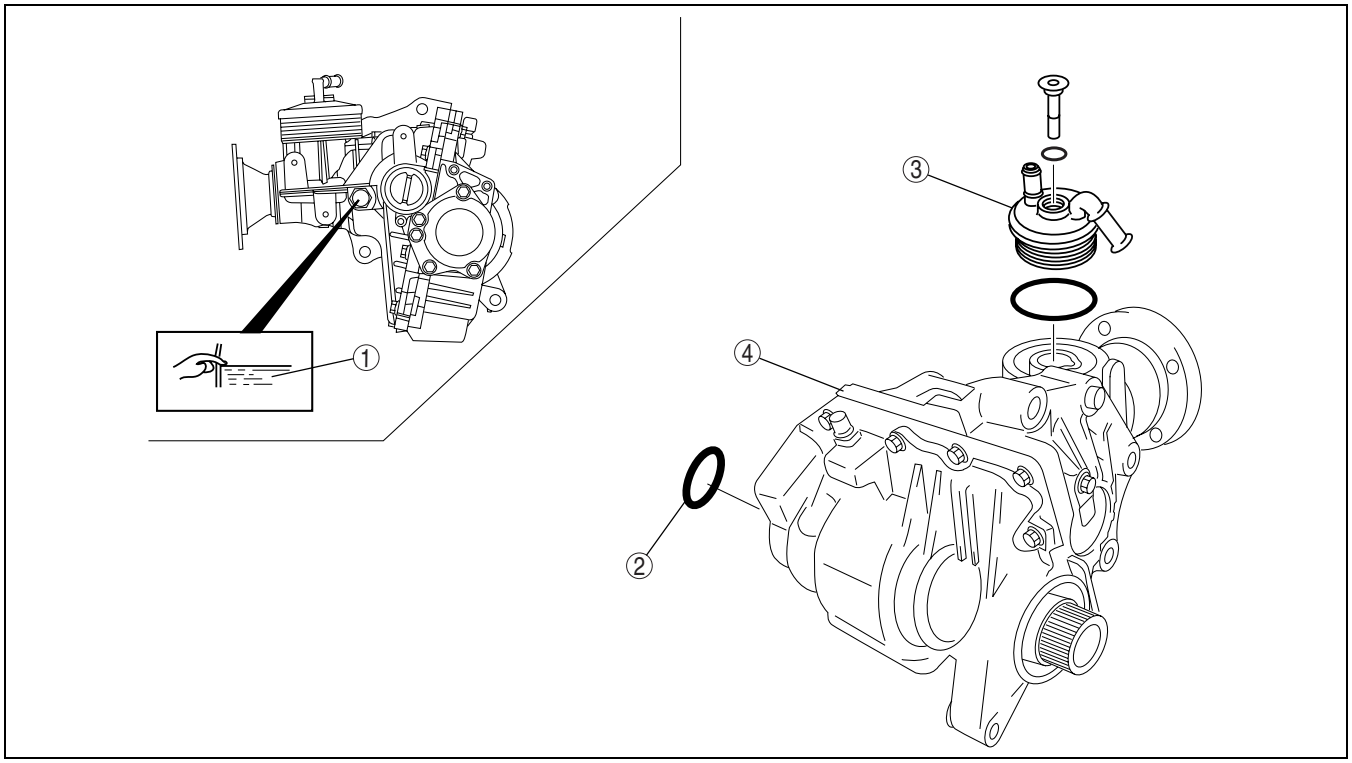
# 03-16 TRANSFER

**TRANSFER LOCATION INDEX . . . . . 03-16–1**
**TRANSFER OIL INSPECTION . . . . . 03-16–2**
**TRANSFER OIL REPLACEMENT . . . . . 03-16–2**
**TRANSFER OIL SEAL REPLACEMENT . . . . . 03-16–2**
**TRANSFER OIL COOLER REMOVAL/INSTALLATION . . . . . 03-16–3**
**TRANSFER REMOVAL/INSTALLATION . . . . . 03-16–3**
No.1 Engine Mount Installation Note . . . 03-16–5

## TRANSFER LOCATION INDEX

id031600800100



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| | |
|---|---|
| 1 | Transfer oil<br>(See 03-16-2 TRANSFER OIL INSPECTION.)<br>(See 03-16-2 TRANSFER OIL REPLACEMENT.) |
| 2 | Transfer oil seal<br>(See 03-16-2 TRANSFER OIL SEAL REPLACEMENT.) |

| | |
|---|---|
| 3 | Transfer oil cooler<br>(See 03-16-3 TRANSFER OIL COOLER REMOVAL/INSTALLATION.) |
| 4 | Transfer<br>(See 03-16-3 TRANSFER REMOVAL/INSTALLATION.) |

## TRANSFER OIL INSPECTION

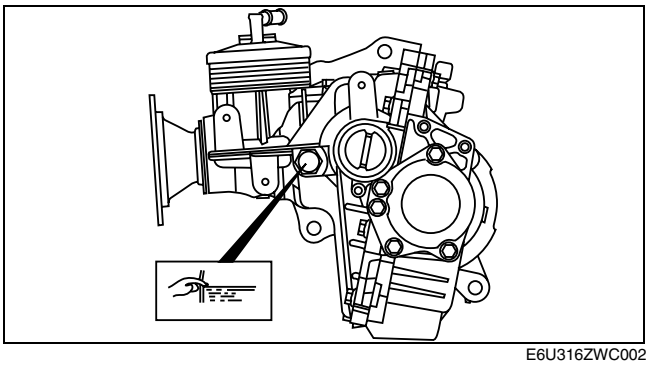
id031600800200

1. Park the vehicle on level ground.
2. Remove the oil level plug and with the washer.
3. Verify that the oil is near the brim of the plug port.
   - If the oil level is low, add the specified amount and type of oil through the oil level plug hole.

   **Transfer oil**
   **Specified oil grade: API Service GL-5**
   **Specified oil viscosity: SAE 80W-90**

4. Tighten the oil level plug with a new washer.

   **Tightening torque**
   **39.2— 58.8 N·m {4.0— 5.9 kgf·m, 29.0— 43.3 ft·lbf}**



E6U316ZWC002

## TRANSFER OIL REPLACEMENT

id031600800300

1. Remove the drain plug with the washer.
2. Drain the oil into a suitable container.
3. Tighten the drain plug with a new washer.

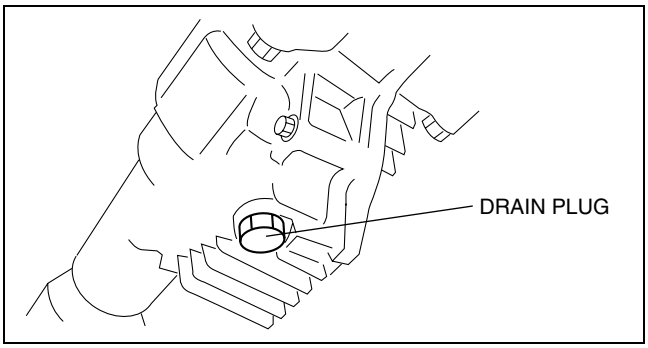
   **Tightening torque**
   **39.2— 58.8 N·m {4.0— 5.9 kgf·m, 29.0— 43.3 ft·lbf}**

4. Remove the oil level plug with the washer and add the specified amount and type of oil through the oil level plug hole until the level reaches the bottom of the oil level plug hole.

   **Transfer oil**
   **Specified oil grade: API Service GL-5**
   **Specified oil viscosity: SAE 80W-90**
   **Capacity (approximate quantity): 1.2 L {1.3 US qt, 1.1 Imp qt}**

5. Tighten the oil level plug with a new washer.

   **Tightening torque**
   **39.2— 58.8 N·m {4.0— 5.9 kgf·m, 29.0— 43.3 ft·lbf}**

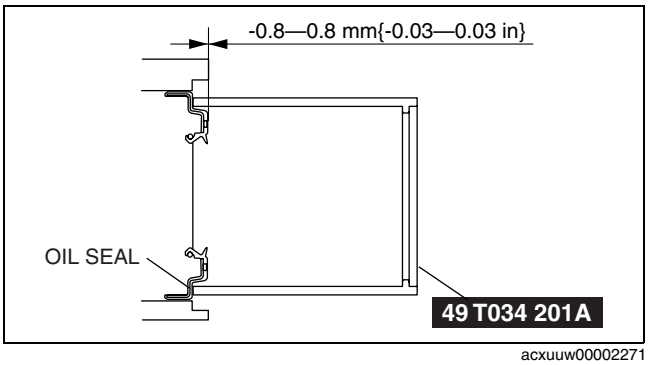



E6U316ZWC003

## TRANSFER OIL SEAL REPLACEMENT

id031600800400

1. On level ground, jack up the vehicle and support it evenly on safety stands.
2. Drain the oil from the transfer. (See 03-16-2 TRANSFER OIL REPLACEMENT.)
3. Remove the joint shaft. (See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD])
4. Remove the oil seals using a screwdriver.
5. Using the **SST** and a hammer, tap each new oil seal.
   **Substitution SST**
   - **49 T034 201A**
     Outer diameter: 59— 64 mm {2.33— 2.51 in}
     Inner diameter: 55 mm {2.17 in} or more
     Plate thickness: 2 mm {0.08 in} or more
     Length: 5 mm {0.20 in} or more
6. Coat the lip of each oil seal with transfer oil.
7. Install the joint shaft. (See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD])
8. Add the specified amount and type of oil. (See 03-16-2 TRANSFER OIL REPLACEMENT.)

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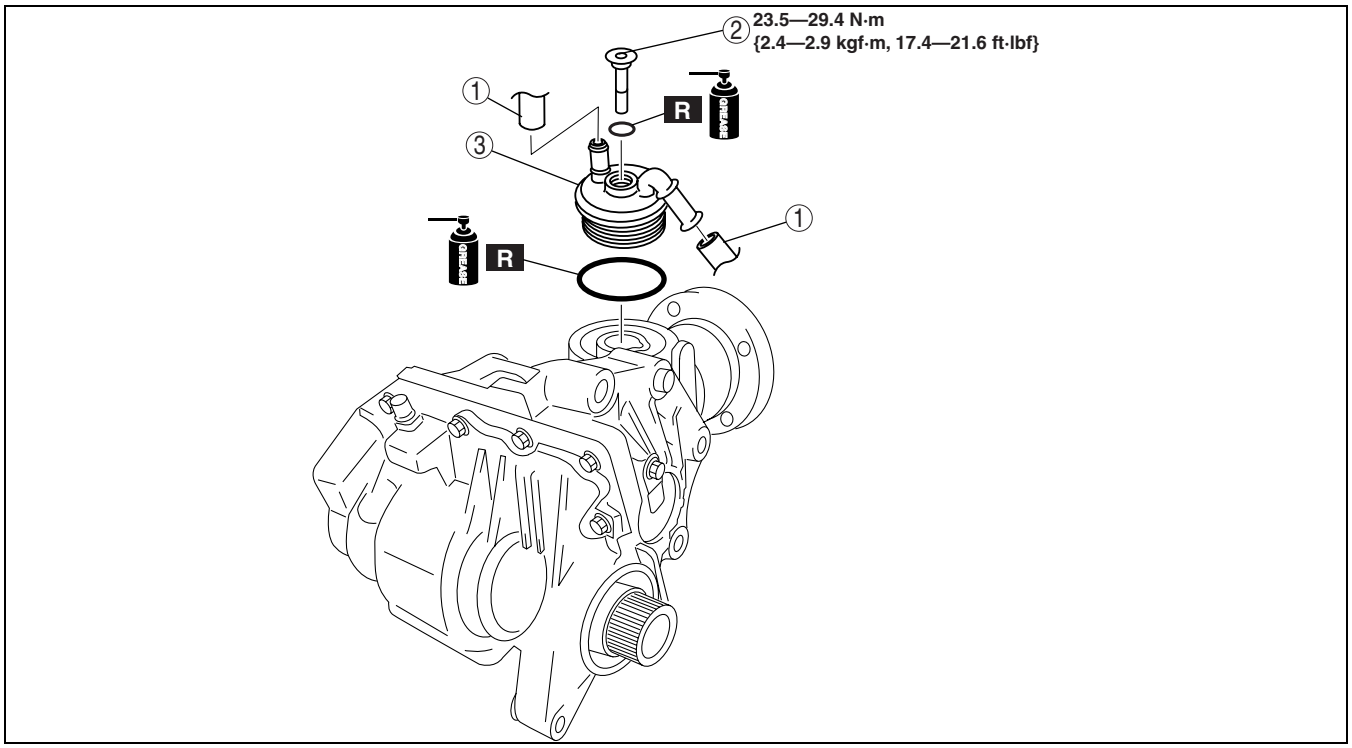
### TRANSFER OIL COOLER REMOVAL/INSTALLATION

id031600800500

1. Disconnect the propeller shaft from the transfer side. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
2. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
3. Drain the transfer oil into a suitable container. (See 03-16-2 TRANSFER OIL REPLACEMENT.)
4. Remove in the order indicated in the figure.
5. Install in the reverse order of removal.
6. Perform the following procedure, if the transfer has been overhauled and installed to the vehicle.
   (1) After warming up the engine, drive the vehicle and inspect for oil leakage and abnormal noise.



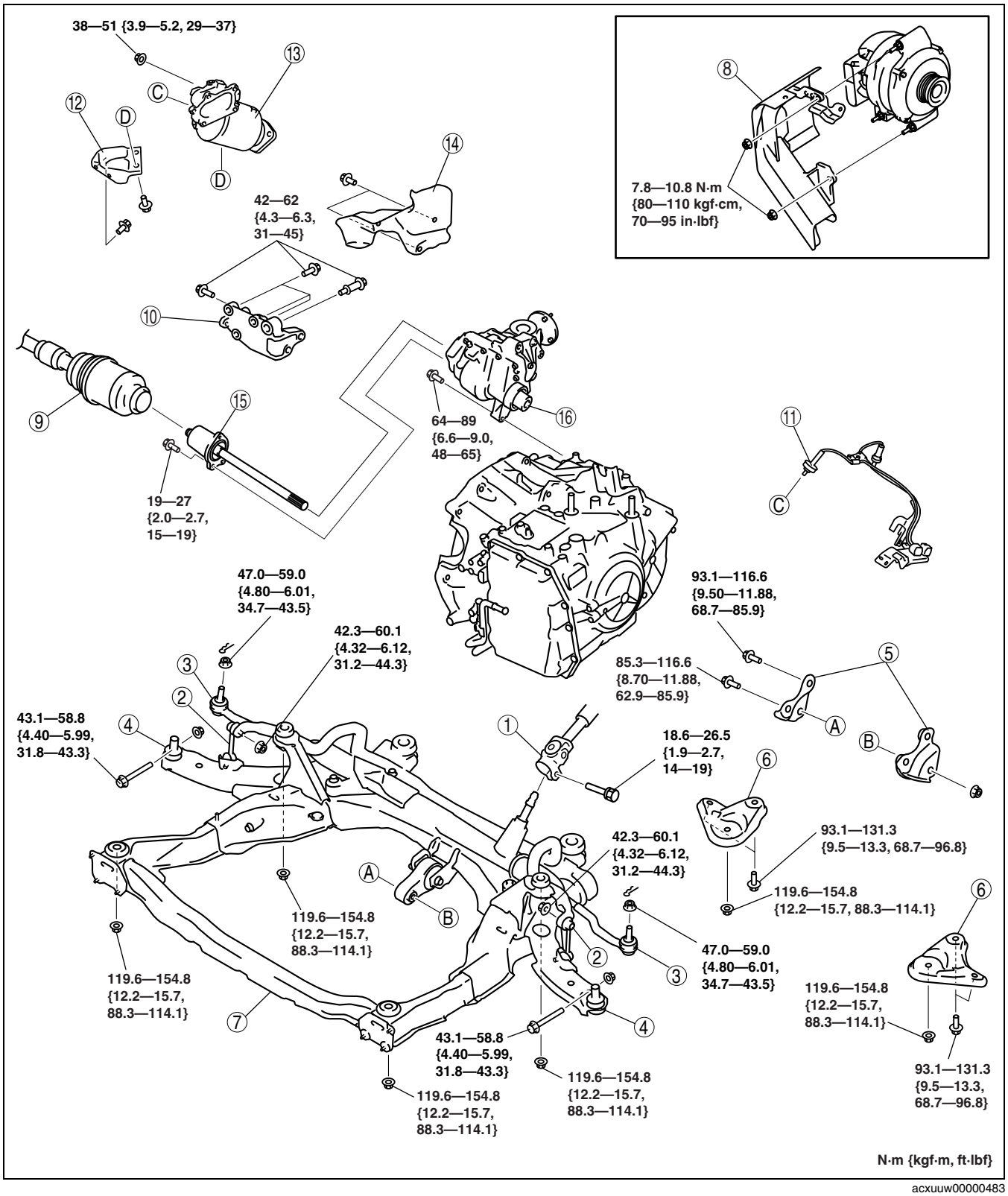

E6U316ZWC007

| | |
|---|---|
| 1 | Water hose |
| 2 | Transfer oil cooler installation bolt |
| 3 | Transfer oil cooler |

### TRANSFER REMOVAL/INSTALLATION

id031600800600

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Battery, battery try (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
   (2) Engine cover
   (3) Intercooler (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   (4) Front pipe (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Disconnect the propeller shaft from the transfer side. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove the transfer oil cooler withe the hose still connected. (See 03-16-3 TRANSFER OIL COOLER REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Warm up the engine and transaxle, inspect for oil leakage, and inspect the transfer operation.

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| | |
|---|---|
| 1 | Steering shaft<br>(See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) |
| 2 | Stabilizer control link |
| 3 | Outer ball joint |
| 4 | Lower arm ball joint |
| 5 | No.1 engine mount bracket<br>(See03-16-5 No.1 Engine Mount Installation Note.) |

| | |
|---|---|
| 6 | Crossmember bracket |
| 7 | Crossmember<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.) |
| 8 | Generator duct<br>(See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC].) |

| | |
|---|---|
| 9 | Drive shaft<br>(See 03-13-12 FRONT DRIVE SHAFT REMOVAL/ INSTALLATION.) |
| 10 | Transfer bracket |
| 11 | HO2S (front)<br>(See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 12 | WU-TWC bracket |
| 13 | WU-TWC<br>(See 01-15-2 EXHAUST SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 14 | Heat shield |
| 15 | Joint shaft<br>(See 03-13-4 JOINT SHAFT REMOVAL/ INSTALLATION[AWD].) |
| 16 | Transfer |

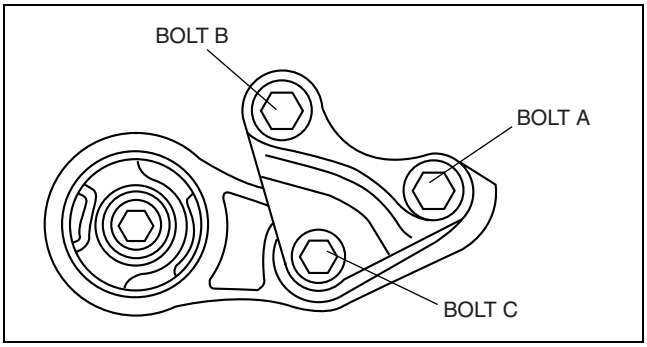


**No.1 Engine Mount Installation Note**

1. Install the No.1 engine mount bracket on the automatic transaxle case and temporarily tighten bolt A and B.
2. Install the No.1 engine mount rubber on the bracket and temporarily tighten bolt C.
3. Fully tighten bolt A and B in order of A→B.

   **Tightening torque**
   **Bolt A, B: 93.1— 116.6 N·m**
   **{9.50— 11.88 kgf·m, 68.7— 85.9 ft·lbf}**
   **Bolt C: 85.3— 116.6 N·m**
   **{87.0— 11.88 kgf·m, 62.9— 85.9 ft·lbf}**

4. Fully tighten the bolt C.



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# 03-19 ALL WHEEL DRIVE (AWD)

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## ELECTRONIC AWD CONTROL SYSTEM LOCATION INDEX

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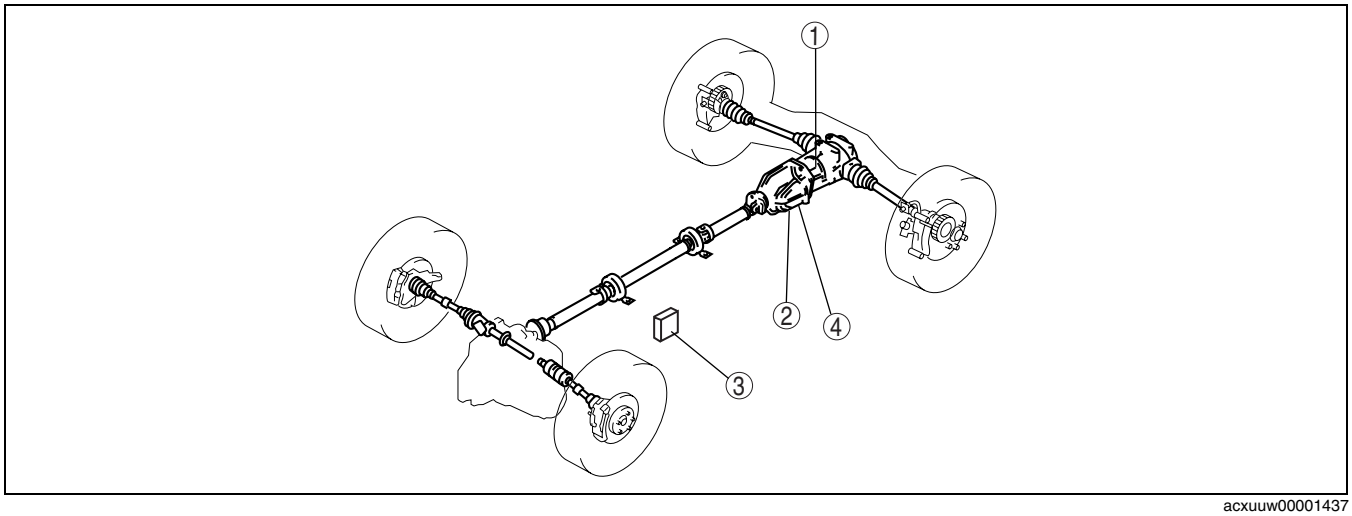


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| | |
|---|---|
| 1 | Differential oil temperature sensor<br>(See 03-19-10 DIFFERENTIAL OIL TEMPERATURE SENSOR INSPECTION)<br>(See 03-19-11 DIFFERENTIAL OIL TEMPERATURE SENSOR REMOVAL/INSTALLATION) |
| 2 | AWD solenoid<br>(See 03-19-11 AWD SOLENOID INSPECTION) |
| 3 | AWD control module<br>(See 03-19-2 AWD CONTROL MODULE INSPECTION)<br>(See 03-19-3 AWD CONTROL MODULE REMOVAL/INSTALLATION) |
| 4 | Coupling component<br>(See 03-19-4 COUPLING COMPONENT REMOVAL/INSTALLATION)<br>(See 03-19-5 COUPLING COMPONENT DISASSEMBLY)<br>(See 03-19-8 COUPLING COMPONENT ASSEMBLY) |

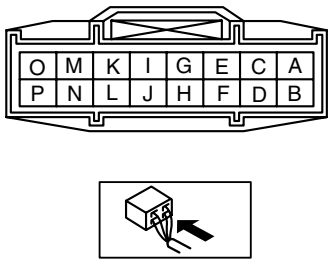
## AWD CONTROL MODULE INSPECTION

id031900800200

**Note**
- AWD CM terminal voltage can vary depending on measuring conditions and vehicle aging, resulting in misdiagnosis. Therefore, it is necessary to perform an overall inspection of the input/output systems and AWD CM to determine which part is malfunctioning.
- With the AWD CM connector connected, measure voltage by connecting the voltmeter negative (-) lead to the body ground and positive (+) lead to each AWD CM terminal.

1. Measure voltage or resistance at each AWD CM terminal using a voltmeter and an ohmmeter.
   - If not as specified, replace the AWD CM.

**Terminal Voltage List (Reference)**

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| Terminal | Signal | Input/ output | Connected to | Measuring item | Test condition | | Voltage (V)/ Continuity | Inspection location in case of failure |
|---|---|---|---|---|---|---|---|---|
| A | Differential oil temperature sensor signal | Input | Differential oil temperature sensor | Voltage | Ignition key ON | Differential oil temperature 20°C {68°F} | 3.0 | • Inspect differential oil temperature sensor<br>• Inspect related harness |
| | | | | | | Differential oil temperature 60°C {140°F} | 1.4 | |
| B | — | — | — | — | — | — | — | — |
| C | Differential oil temperature sensor GND | — | Differential oil temperature sensor | Continuity | Any condition | | Yes | • Inspect related harness |
| D | — | — | — | — | — | — | — | — |
| E | — | — | — | — | — | — | — | — |
| F | — | — | — | — | — | — | — | — |
| G | CAN_H | Input/ output | — | Perform measurement during DTC inspection. | | | | — |
| H | CAN_L | Input/ output | — | Perform measurement during DTC inspection. | | | | — |
| I | Power supply (Ignition switch) | Input | Ignition key | Voltage | Ignition key ON | | B+ | • Inspect fuse<br>• Inspect related harness |
| | | | | | Ignition key OFF | | 1.0 or below | |
| J | — | — | — | — | — | — | — | — |
| K | Power supply (Main) | Input | Battery | Voltage | Any condition | | B+ | • Inspect fuse<br>• Inspect related harness |
| L | — | — | — | — | — | — | — | — |
| M | — | — | — | — | — | — | — | — |
| N | Ground | — | Ground | Voltage | Any condition | | 0 | • Inspect related harness |
| O | AWD solenoid (+) | Output | AWD solenoid | Voltage | Ignition key ON | | B+ | • AWD solenoid<br>• Inspect related harness |
| | | | | | Ignition key OFF | | 1.0 or below | |

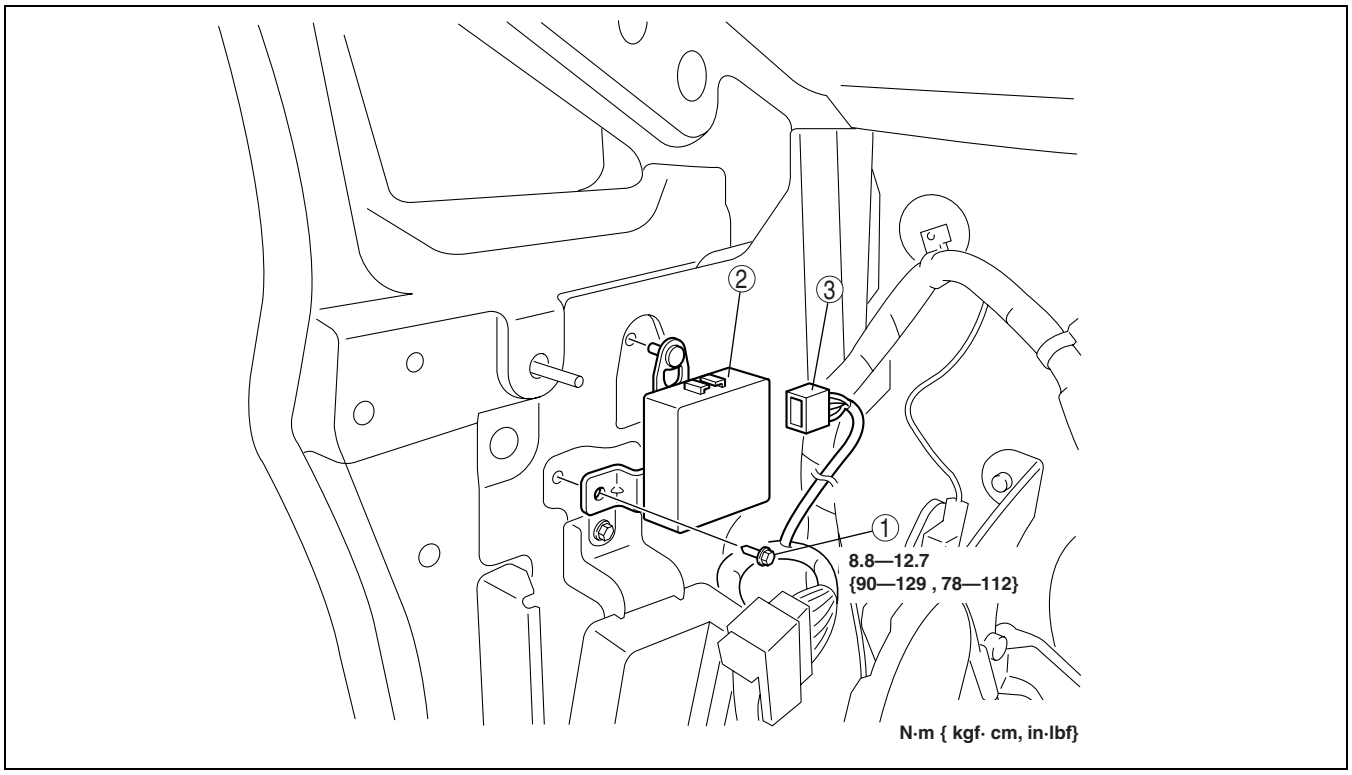
| Terminal | Signal | Input/ output | Connected to | Measuring item | Test condition | Voltage (V)/ Continuity | Inspection location in case of failure |
|---|---|---|---|---|---|---|---|
| P | AWD solenoid (-) | Output | AWD solenoid | Voltage | Ignition key ON | B+ | • AWD solenoid<br>• Inspect related harness |
| | | | | | Ignition key OFF | 1.0 or below | |

### AWD CONTROL MODULE REMOVAL/INSTALLATION

id031900800300

1. Disconnect the negative battery cable.
2. Remove the lower panel (Driver's side). (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.



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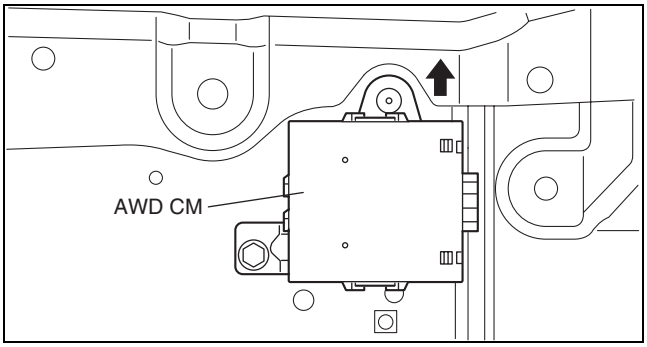
| | |
|---|---|
| 1 | Bolt |
| 2 | AWD CM<br>(See 03-19-3 AWD CM Removal Note.) |

| | |
|---|---|
| 3 | Connector |

### AWD CM Removal Note

1. Push up the AWD CM slightly, and remove it.

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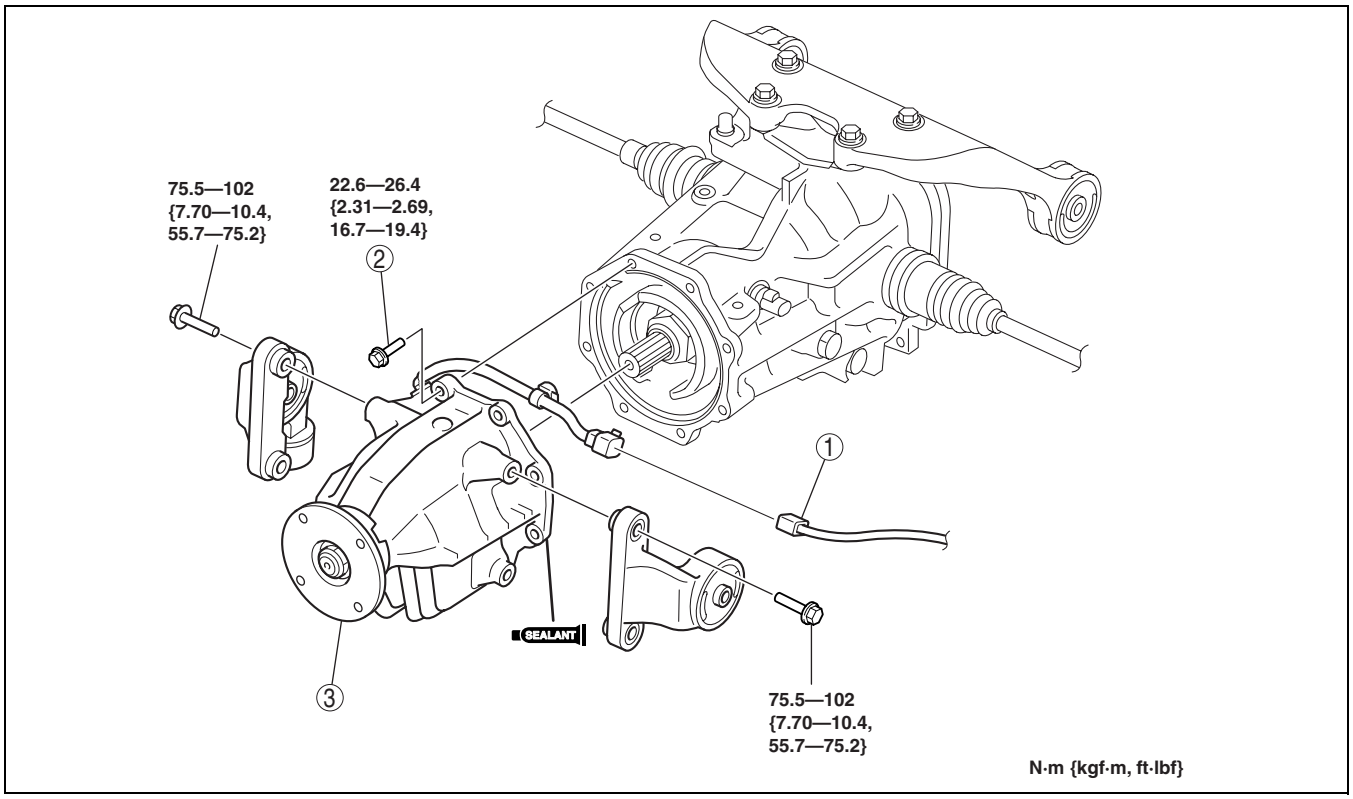
## COUPLING COMPONENT REMOVAL/INSTALLATION

id031900800400

1. Drain the rear differential oil into a container.
2. Remove the main silencer and middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the propeller shaft. (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. Add rear differential oil. (See 03-14-2 DIFFERENTIAL OIL REPLACEMENT.)

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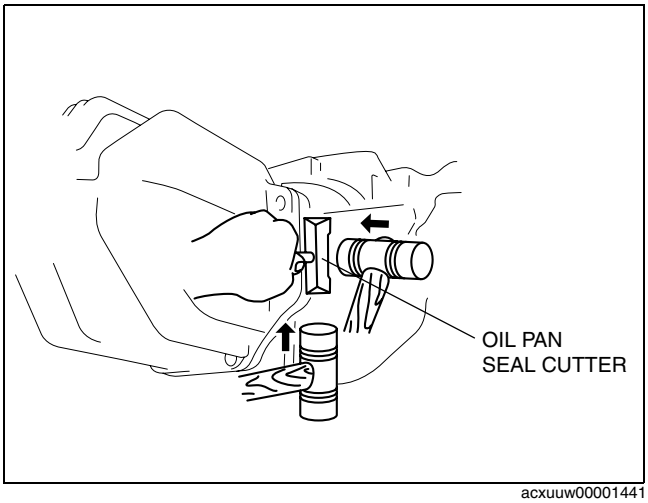
| | |
|---|---|
| 1 | AWD solenoid connector |
| 2 | Bolt |

| | |
|---|---|
| 3 | Coupling component<br>(See 03-19-4 Coupling Component Removal Note)<br>(See 03-19-5 Coupling Component Installation Note) |

### Coupling Component Removal Note

1. Support the coupling unit with a transmission jack.
2. Cut away the coupling unit using an oil pan seal cutter.

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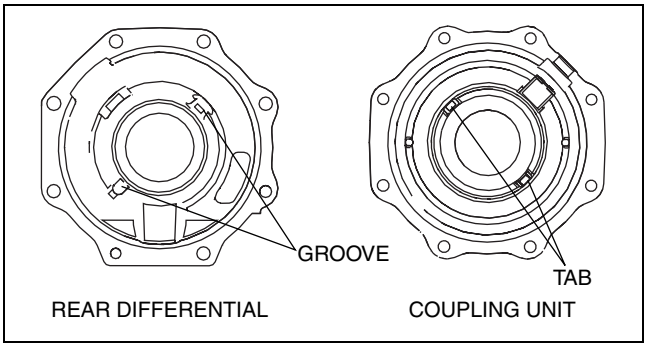
**Coupling Component Installation Note**

**Note**
- Clean away the old sealant before applying the new sealant.
- Install the coupling unit within **10 min** after applying sealant.
- Allow the sealant to set at least **30 min** after installation before filling the differential with the specified oil.

1. Apply sealant to the coupling case surface that contacts the rear differential case.
2. Install the coupling unit to the rear differential so that the two tabs on the coupling unit engage the rear differential grooves (two locations).

**Tightening torque**
**22.6— 26.4 N·m {2.4— 2.6 kgf·m, 16.7— 19.4 ft·lbf}**

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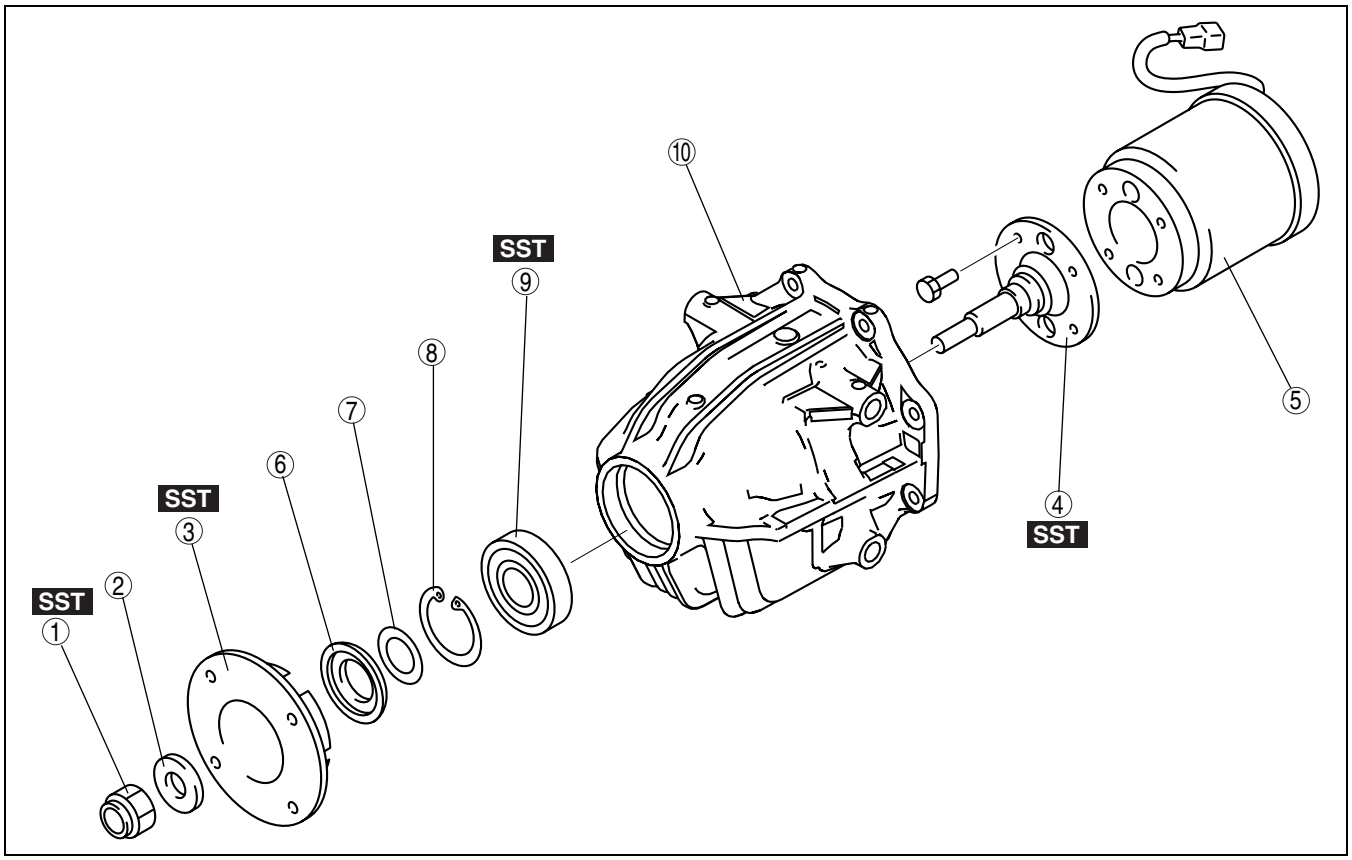
**COUPLING COMPONENT DISASSEMBLY**

id031900800500

**Warning**
- **The engine stand is equipped with a self-lock mechanism, however, if the coupling unit is in a tilted condition, the self-lock mechanism could become inoperative. If the coupling unit unexpectedly rotates it could cause injury, therefore do not maintain the coupling unit in a tilted condition. When turning the coupling unit, grasp the rotation handle firmly.**

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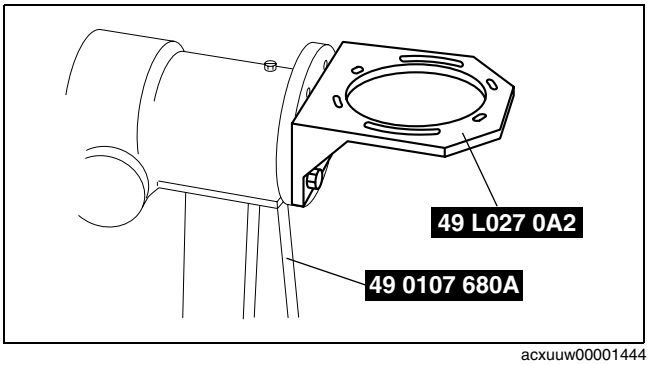
| | |
|---|---|
| 1 | Locknut<br>(See 03-19-6 Locknut Disassembly Note) |
| 2 | Washer |

| | |
|---|---|
| 3 | Companion flange<br>(See 03-19-6 Companion Flange Disassembly Note) |

| | |
|---|---|
| 4 | Output shaft<br>(See 03-19-7 Output Shaft Disassembly Note) |
| 5 | Coupling component |
| 6 | Oil seal |
| 7 | Shim |
| 8 | Snap ring |
| 9 | Bearing<br>(See 03-19-7 Bearing Disassembly Note) |
| 10 | Coupling case |

**Locknut Disassembly Note**

1. Assemble the **SSTs** to the engine stand.

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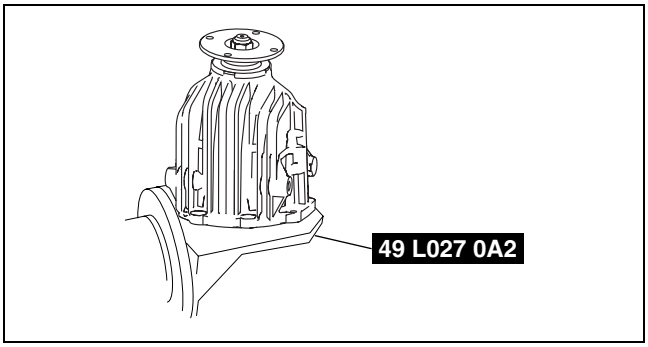
2. Install the coupling unit to the **SSTs** as shown.

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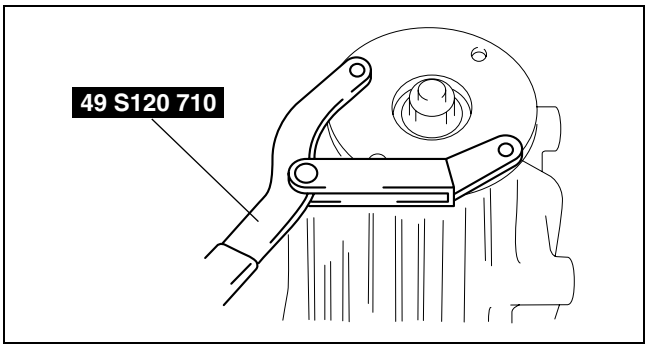
3. Secure the companion flange using the **SST**, and remove the locknut.

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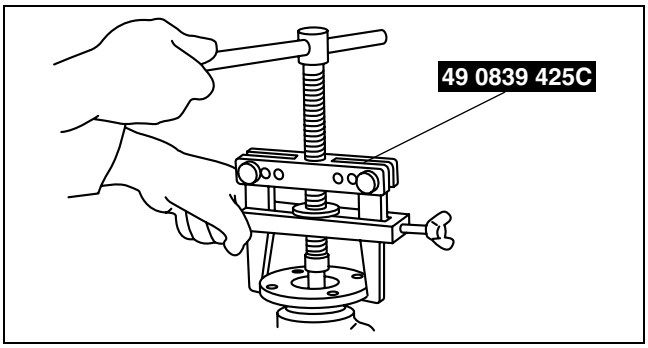
**Companion Flange Disassembly Note**

1. Remove the companion flange using the **SST**.

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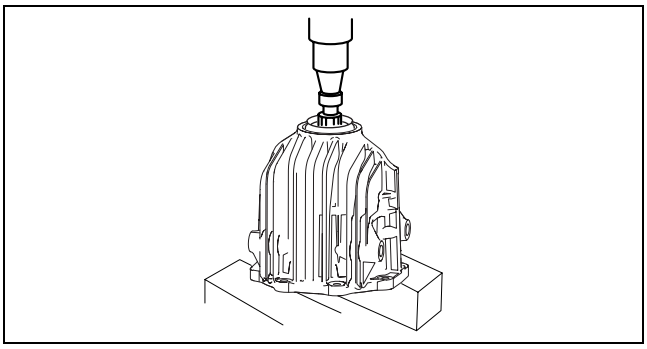
**Output Shaft Disassembly Note**

1. Remove the coupling unit from the **SST**.
2. Install the coupling unit to the press as shown, and remove the output shaft together with the coupling unit.
3. Install the companion flange to the output shaft.



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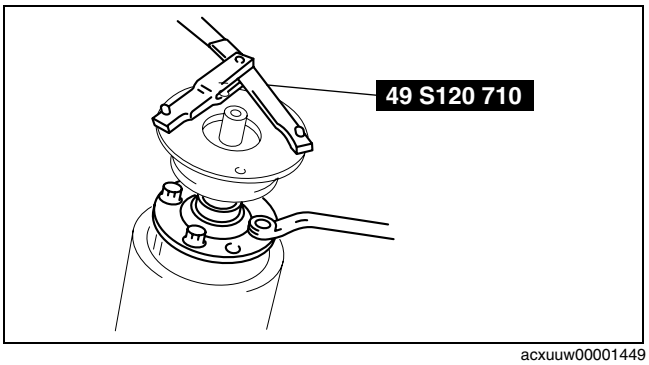
4. Secure the companion flange using the **SST**, and remove the bolts.
5. Remove the output shaft.

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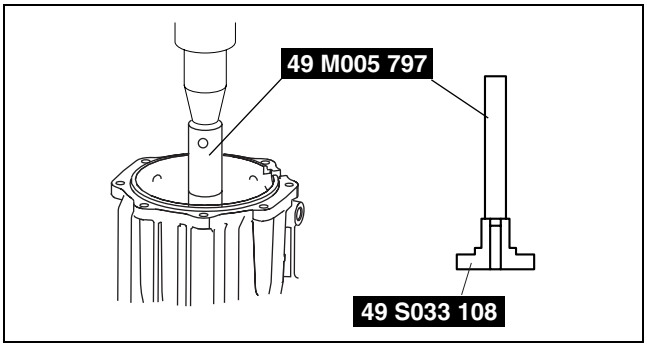
**Bearing Disassembly Note**

1. Remove the bearing using the **SSTs** and a press.
   **Substitution SST**
   - **49 S033 108**
     Outer diameter: 33— 55 mm {1.30— 2.16 in}
     Height: 155 mm {6.10 in} or more

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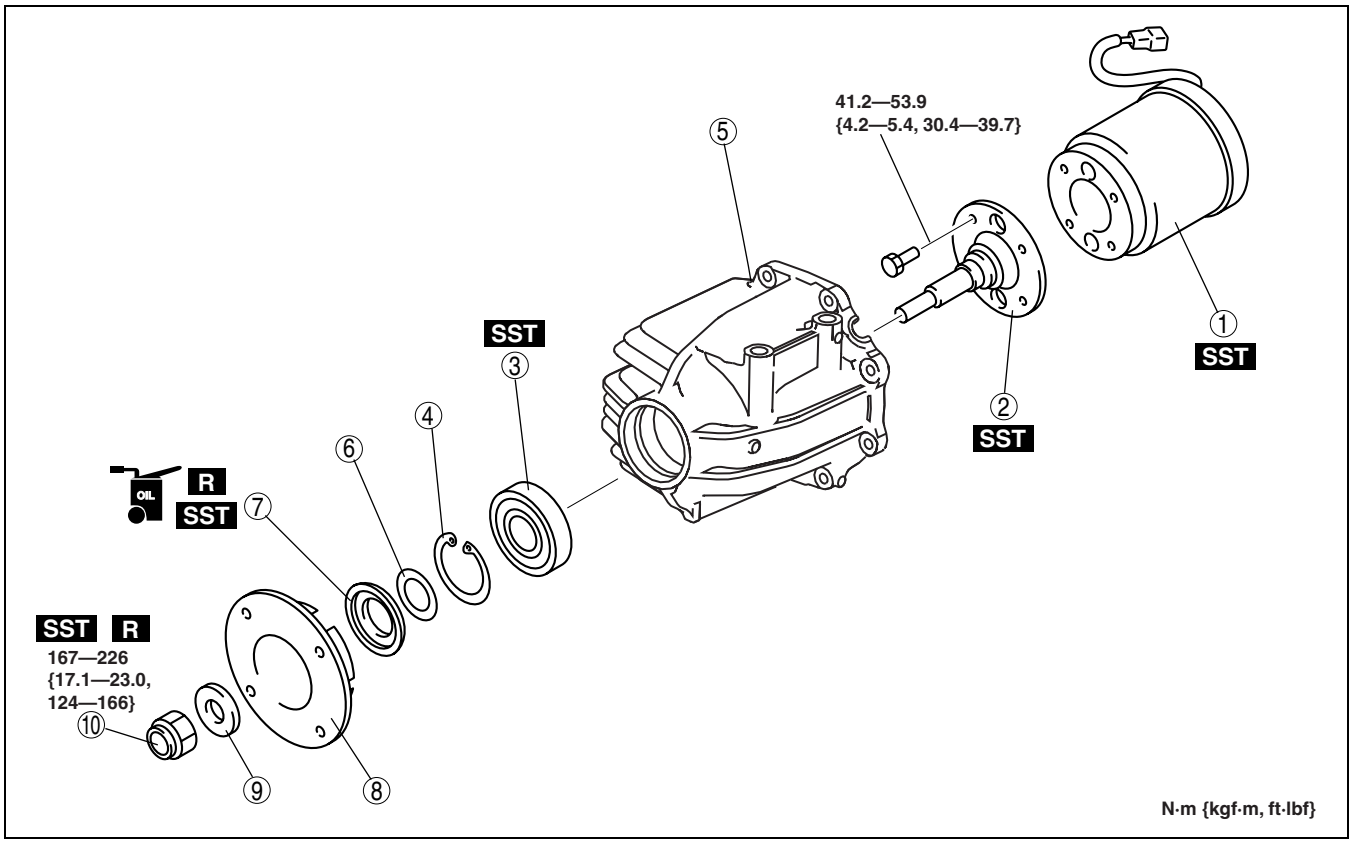
## COUPLING COMPONENT ASSEMBLY

id031900800600

**Warning**

- **The engine stand is equipped with a self-lock mechanism, however, if the coupling unit is in a tilted condition, the self-lock mechanism could become inoperative. If the coupling unit unexpectedly rotates it could cause injury, therefore do not maintain the coupling unit in a tilted condition. When turning the coupling unit, grasp the rotation handle firmly.**

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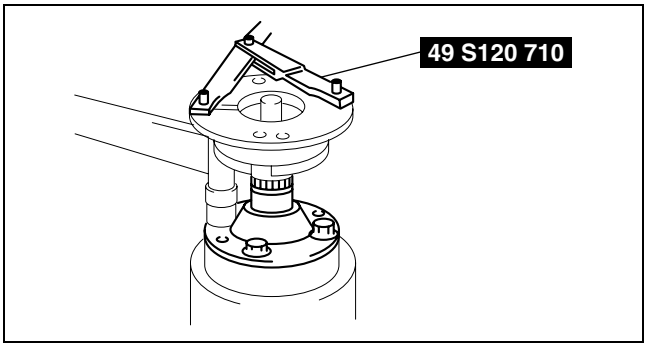
| | |
|---|---|
| 1 | Coupling unit |
| 2 | Output shaft<br>(See 03-19-9 Output Shaft Assembly Note) |
| 3 | Bearing<br>(See 03-19-9 Bearing Assembly Note) |
| 4 | Snap ring |
| 5 | Coupling case<br>(See 03-19-9 Coupling Case Assembly Note) |

| | |
|---|---|
| 6 | Shim |
| 7 | Oil seal<br>(See 03-19-9 Oil Seal Assembly Note) |
| 8 | Companion flange<br>(See 03-19-10 Companion Flange Assembly Note) |
| 9 | Washer |
| 10 | Locknut<br>(See 03-19-10 Locknut Assembly Note) |

**Output Shaft Assembly Note**

1. Install the output shaft to the coupling unit and partially tighten the bolts.
2. Install the companion flange to the output shaft.
3. Secure the companion flange using the **SST**, and tighten the bolts.

**Tightening torque**
**41.2— 53.9 N·m {4.2— 5.4 kgf·m, 30.4— 39.7 ft·lbf}**

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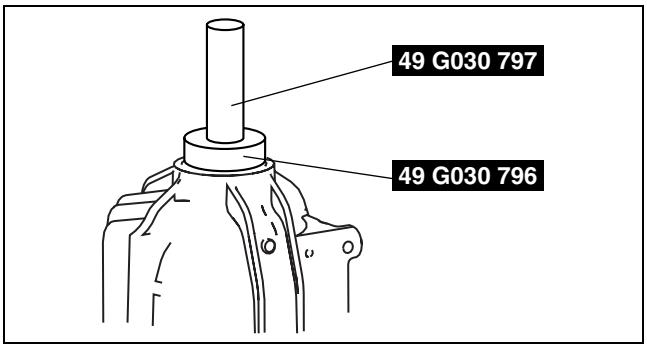
**Bearing Assembly Note**

1. Assemble the bearing to the coupling case using the **SSTs**.
   **Substitution SST**
   - **49 G030 796**
     Outer diameter: 58— 61 mm {2.29— 2.40 in}

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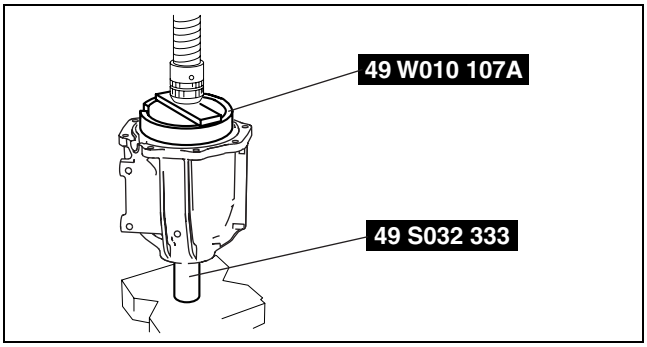
**Coupling Case Assembly Note**

**Caution**
- **The coupling unit will be damaged if it is pressed directly by a press. Always press the coupling unit into the coupling case using the SST.**

1. Assemble the coupling unit to the coupling case using the **SSTs** and a press.
   **Substitution SST**
   - **49 S032 333**
     Outer diameter: 34.2— 40.0 mm {1.35— 1.57 in}
     Inner diameter: 30.2— 32.2 mm {1.19— 1.26 in}
     Inner depth: 65.2 mm {2.57 in} or more

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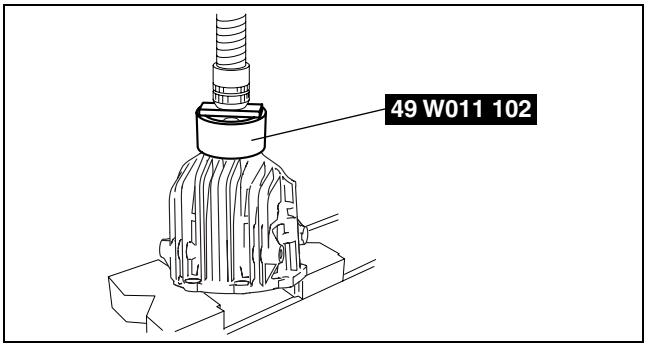
**Oil Seal Assembly Note**

1. Apply the specified oil to a new oil seal lip.
2. Install the oil seal to the coupling case using the **SST**.
   **Substitution SST**
   - **49 W011 102**
     Outer diameter: 66 mm {2.60 in} or more
     Inner diameter: 54— 60 mm {2.13— 2.36 in}
     Inner depth: 17.5 mm {0.69 in} or more

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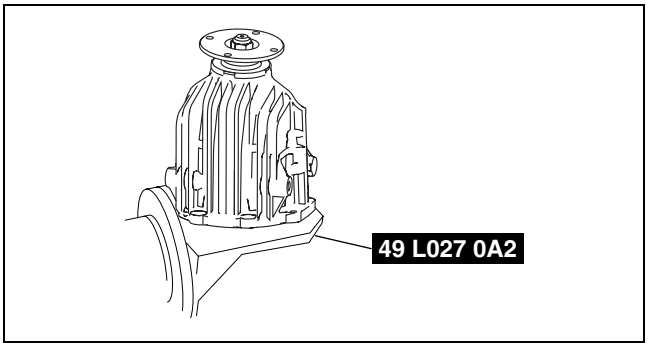
**Companion Flange Assembly Note**

1. Install the coupling case to the **SSTs** as shown.
2. Install the companion flange.

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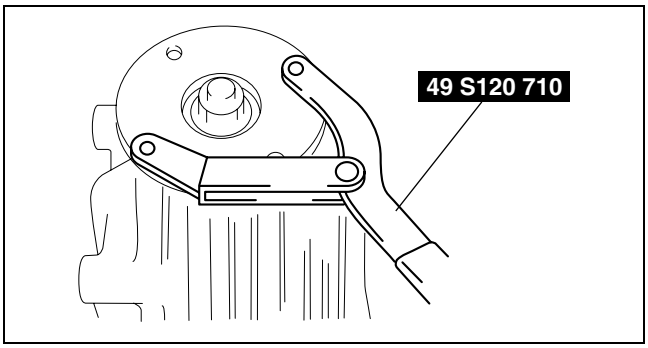
**Locknut Assembly Note**

1. Secure the companion flange using the **SST**, and tighten a new locknut.

   **Tightening torque**
   **167— 226 N·m {17.1— 23.0 kgf·m, 124— 166 ft·lbf}**

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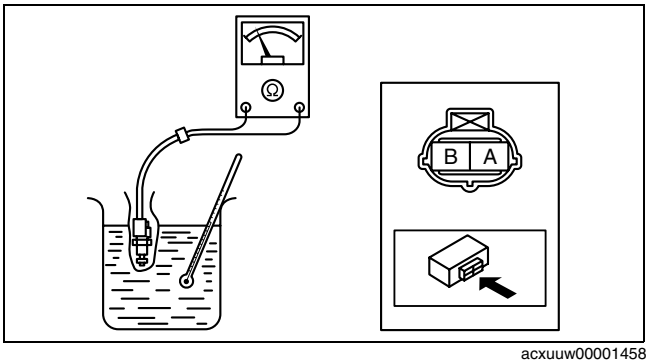
**DIFFERENTIAL OIL TEMPERATURE SENSOR INSPECTION**

id031900800700

**Warning**

- **Hot differential oil may cause severe burns. Do not perform maintenance while differential oil is hot.**

1. Disconnect the negative battery cable.
2. Disconnect the differential oil temperature sensor connector and remove the differential oil temperature sensor.
3. Wrap the differential oil temperature sensor with plastic wrap and immerse it into a beaker filled with water. Gradually raise the water temperature, and measure resistance between differential oil temperature sensor terminals A and B.
   - If not as specified, inspect the harness for continuity. If there is normal continuity between the terminals, replace the differential oil temperature sensor.

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**Differential oil temperature sensor specification**

| Water temperature (°C {°F}) | Resistance (kirohm) |
|---|---|
| 0 {32} | 91— 100 |
| 10 {50} | 56— 61 |
| 20 {68} | 35— 39 |
| 30 {86} | 23— 25 |
| 40 {104} | 14— 17 |
| 50 {122} | 10— 11 |
| 60 {140} | 7.1— 7.9 |
| 70 {158} | 5.0— 5.6 |
| 80 {176} | 3.6— 4.0 |

4. Install the differential oil temperature sensor and connect the connector.
5. Connect the negative battery cable.

## DIFFERENTIAL OIL TEMPERATURE SENSOR REMOVAL/INSTALLATION

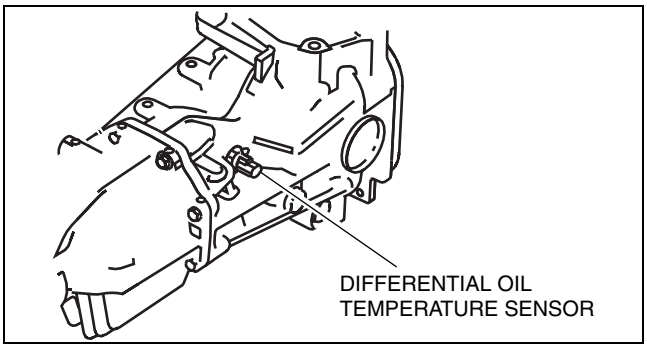
id031900800800

**Warning**
- **Hot differential oil may cause severe burns. Do not perform maintenance while differential oil is hot.**

1. Disconnect the negative battery cable.
2. Disconnect the differential oil temperature sensor connector.
3. Remove the differential oil temperature sensor.
4. Apply differential oil to the O-ring.
5. Install the differential oil temperature sensor.

**Tightening torque**
**12.7— 17.3 N·m {1.3— 1.7 kgf·m, 9.4— 12.7 ft·lbf}**

6. Connect the differential oil temperature sensor connector.
7. Connect the negative battery cable.

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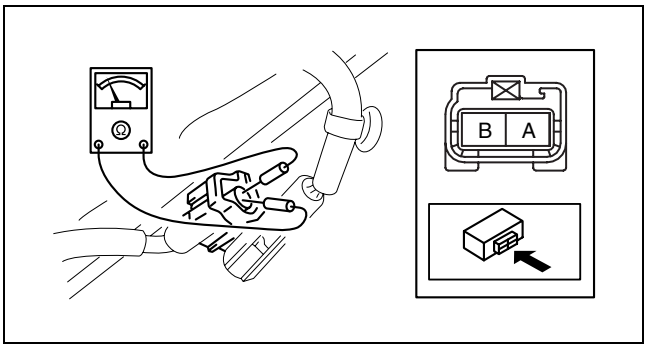
## AWD SOLENOID INSPECTION

id031900800900

1. Disconnect the negative battery cable.
2. Disconnect the AWD solenoid connector.
3. Measure resistance between AWD solenoid connector terminals A and B.
   - If the resistance is not within the specification, replace the coupling unit.

**AWD solenoid resistance**
**1.5— 2.0 ohms**
**(Rear differential oil temperature at 20°C {68°F})**

4. Connect the AWD solenoid connector.
5. Connect the negative battery cable.

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# 03-50 TECHNICAL DATA

**DRIVELINE/AXLE TECHNICAL DATA . . 03-50–1**

## DRIVELINE/AXLE TECHNICAL DATA

id035000800100

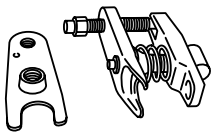
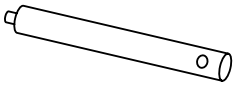
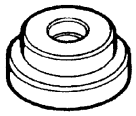
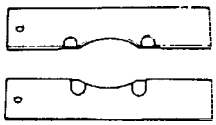
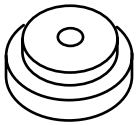
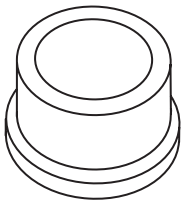
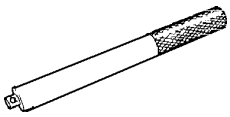
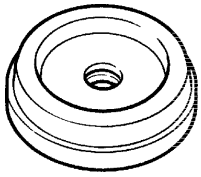
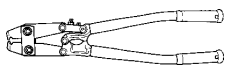
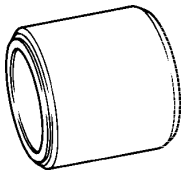
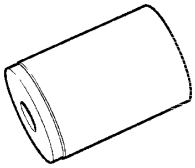
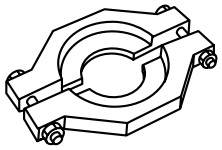
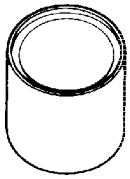
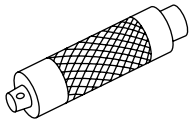
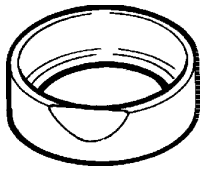
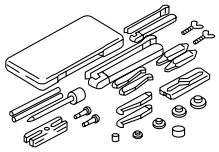
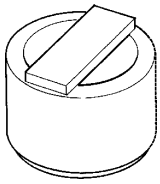
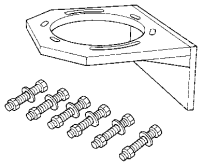
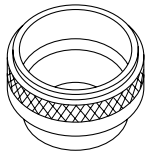
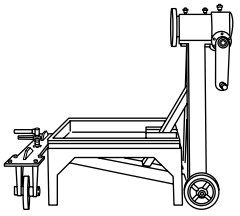
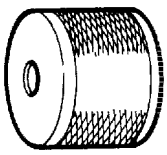
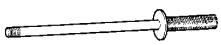
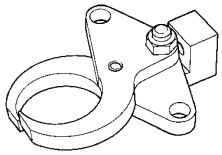
| Item | Specification |
|---|---|
| Front wheel bearing maximum play | 0.05 mm {0.002 in} |
| Rear wheel bearing maximum play | 0.05 mm {0.002 in} |
| Front drive shaft length | LH: 658.2—668.2 mm {25.92—26.30 in}<br>RH: 621.2—631.2 mm {24.46—24.85 in} |
| Rear drive shaft length | LH: 840.8—850.8 mm {33.11—33.49 in}<br>RH: 862.3—872.3 mm {33.95—34.34 in} |
| Rear differential oil | Specified oil grade: API service GL-5<br>Specified oil viscosity: SAE 80W-90<br>Capacity (approximate quantity): 1.00 L {1.06 US qt, 0.88 Imp qt} |
| Rear differential backlash of pinion gear and side gear | 0.1 mm {0.004 in} or less |
| Rear differential pinion height | –0.032—0.032 mm {–0.0012—0.0012 in} |
| Rear differential drive pinion preload | 1.3—1.8 N·m {13.3—18.2 kgf·cm, 11.5—15.9 in·lbf} |
| Rear differential backlash of drive pinion and ring gear | Standard: 0.09—0.11 mm {0.003—0.004 in}<br>Minimum value: 0.05 mm {0.002 in} |
| Propeller shaft maximum runout | 0.8 mm {0.031 in} |
| Propeller shaft starting torque | 0.29—1.47 N·m {3.0—14.9 kgf·cm, 2.6—13.0 in·lbf} |
| Transfer oil | Specified oil grade: API Service GL-5<br>Specified oil viscosity: SAE 80W-90<br>Capacity (approximate quantity): 1.2 L {1.3 US qt, 1.1 Imp qt} |

# 03-60 SERVICE TOOLS

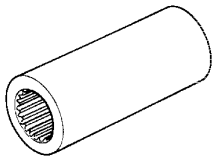
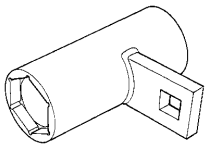
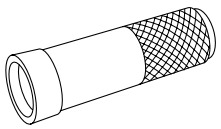
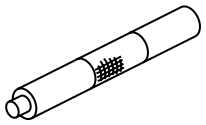
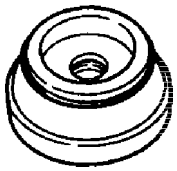
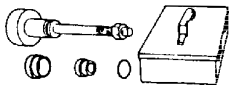
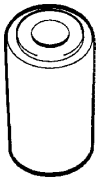
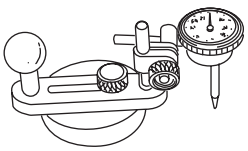
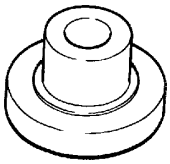
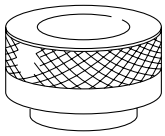
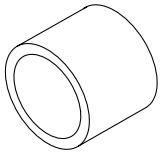
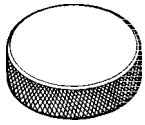
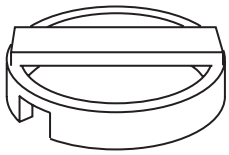
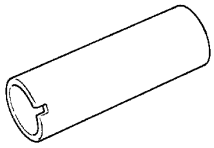
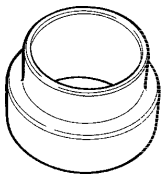
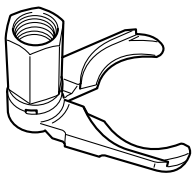
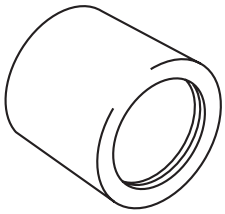
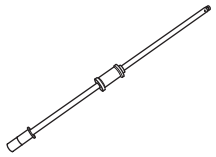
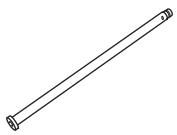
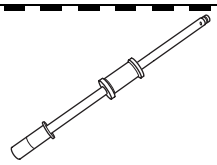
**DRIVELINE/AXLE SST . . . . . 03-60–1**

## DRIVELINE/AXLE SST

id036000800200

| | | |
|---|---|---|
| 49 T028 3A0<br>Ball joint puller set<br>  | 49 G033 102<br>Handle<br>  | 49 G033 105<br>Attachment<br>  |
| 49 F026 103<br>Wheel hub puller<br>  | 49 G033 106<br>Attachment<br>  | 49 F027 009<br>Attachment ø68 & 77<br>  |
| 49 F027 003<br>Handle<br>  | 49 F027 004<br>Attachment ø80<br>  | 49 T025 001<br>Boot clamp crimpers<br>  |
| 49 B014 001<br>Oil seal installer<br>  | 49 W034 301<br>Support block<br>  | 49 H027 002<br>Bearing remover<br>  |
| 49 B025 004<br>Dust seal installer<br>  | 49 G030 797<br>Handle<br>  | 49 G033 107A<br>Dust cover installer<br>  |
| 49 S120 710<br>Coupling flange holder<br> | 49 0839 425C<br>Bearing puller set<br>  | 49 W011 102<br>Oil seal installer<br>  |
| 49 L027 0A2<br>Diff hanger set<br>  | 49 G030 338<br>Attachment E<br>  | 49 0107 680A<br>Engine stand<br>  |
| 49 T032 317<br>Weight<br>  | 49 T032 316<br>Shaft<br>  | 49 L027 004<br>Gear case remover<br>  |

# SERVICE TOOLS

| | | |
|---|---|---|
| 49 L027 006<br>Serrate socket<br>  | 49 L027 007<br>Hex socket<br>  | 49 F401 331<br>Bearing installer body<br>  |
| 49 M005 797<br>Oil seal installer<br>  | 49 F027 007<br>Attachment $\phi$ *72*<br>  | 49 8531 565<br>Drive pinion model<br>  |
| 49 G032 347<br>Oil seal installer<br>  | 49 0727 570<br>Pinion height gauge body<br>  | 49 S033 108<br>Bearing installer<br>  |
| 49 V001 525<br>Bearing installer<br>  | 49 G027 005<br>Collar<br>  | 49 0305 555<br>Gauge block<br>  |
| 49 W010 107A<br>Oil seal installer<br>  | 49 S032 333<br>Bearing installer<br>  | 49 G027 006<br>Installer<br> |
| 49 F401 337A<br>Attachment C<br>  | 49 B025 010<br>Attachment A<br>  | 49 G030 796<br>Oil seal installer<br> |
| 49 8531 568<br>Collar<br> | 49 T034 201A<br>Dust boot installer<br>  | 49 B025 017<br>Sliding hammer<br>  |
| 49 B025 016<br>Extension<br>  | 49 0223 630B<br>Rear shaft puller body<br>  | — |

# BRAKES

**04**
SECTION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## 04-02 ON-BOARD DIAGNOSTIC


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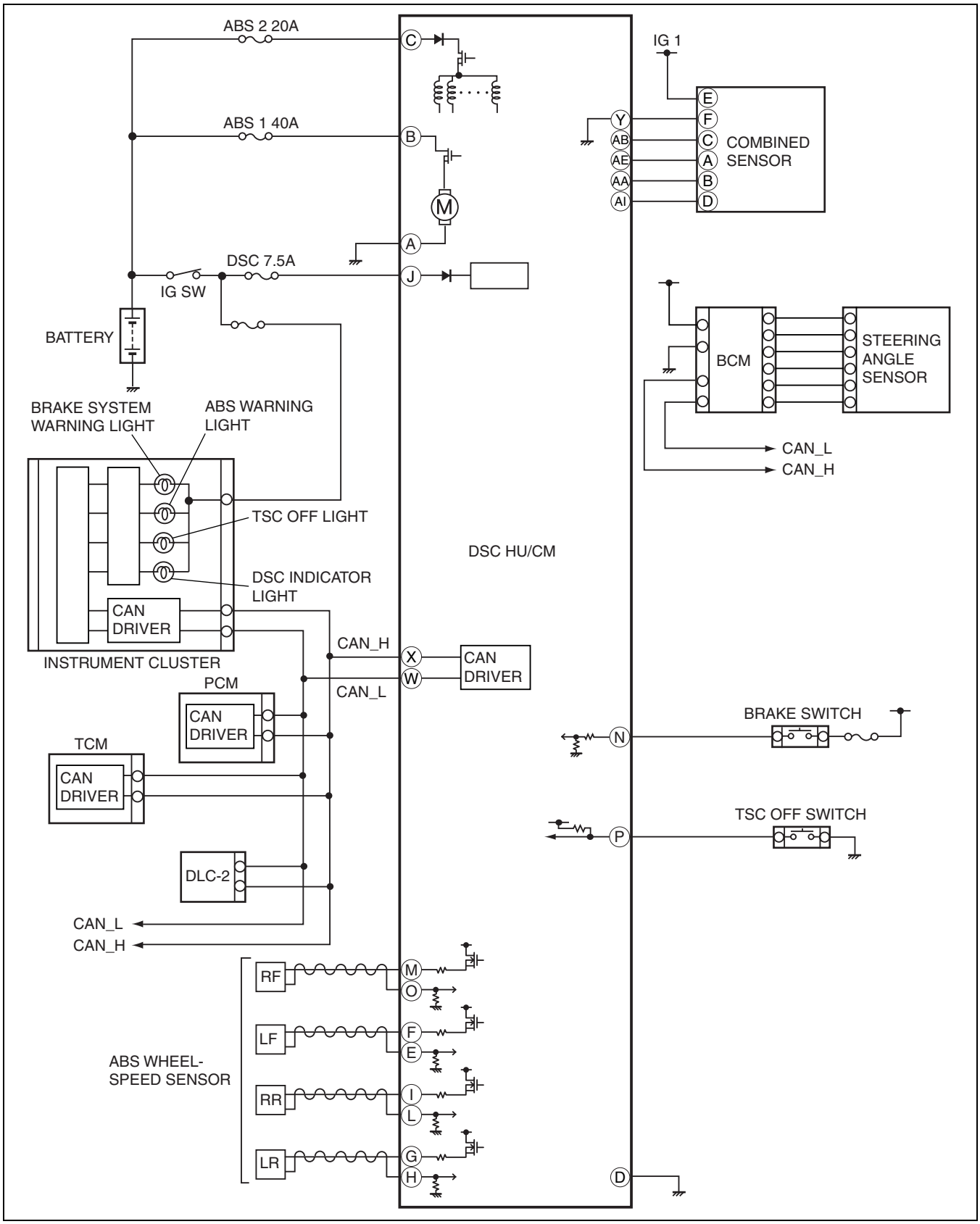
**DTC C1288, C1290, C1953 . . . . . 04-02–27**
**DTC C1295, C1307, C1937, C1938. . . . . 04-02–28**
**DTC C1306 . . . . . 04-02–29**
**DTC C1414 . . . . . 04-02–30**
**DTC C1994 . . . . . 04-02–30**

## SYSTEM WIRING DIAGRAM

id040200804800

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## ON-BOARD DIAGNOSIS

id040200800200

### On-Board Diagnostic (OBD) Test Description

- The OBD test inspects the integrity and function of the DSC and outputs the results when requested by the specific tests.
- On-board diagnostic test also:
  - — Provides a quick inspection of the DSC usually performed at the start of each diagnostic procedure.
  - — Provides verification after repairs to ensure that no other faults occurred during service.
- The OBD test is divided into 3 tests:
  - — Read/clear diagnostic results, PID monitor and record and active command modes.

### Read/clear diagnostic results

- This function allows you to read or clear DTCs in the DSC HU/CM memory.

### PID/Data monitor and record

- This function allows you to access certain data values, input signals, calculated values, and system status information.

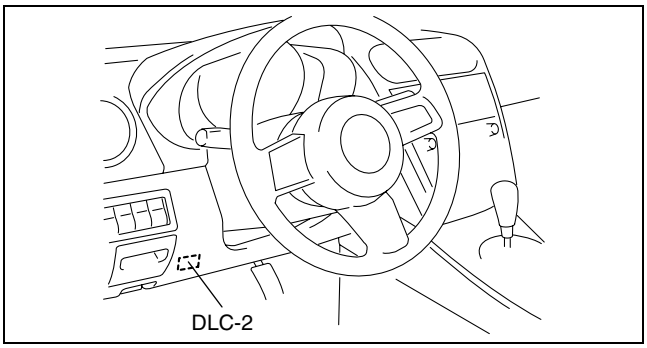


### Active command modes

- This function allows you to control devices through the M-MDS.

### Reading DTCs Procedure

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “ABS”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the DSC. (See 04-02-3 ON-BOARD DIAGNOSIS.)

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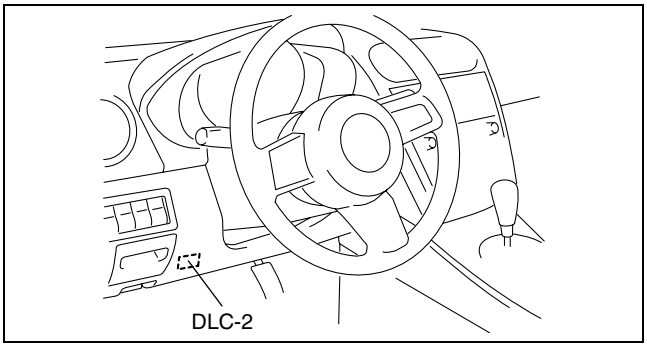
### Clearing DTCs Procedures

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “ABS”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTCs are displayed.

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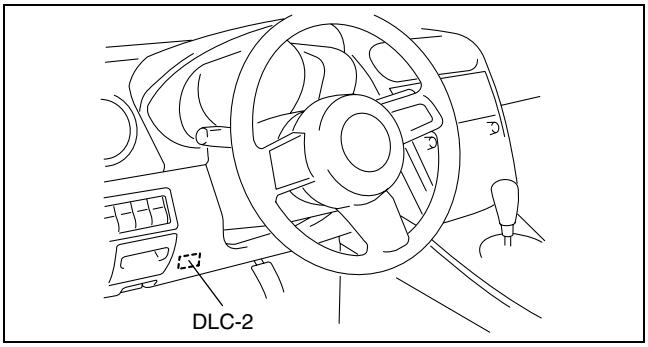
**PID/Data Monitor and Record Procedure**

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “ABS”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.



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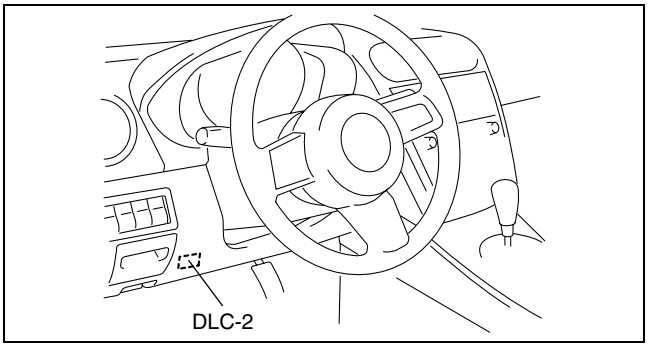
**Note**

- The PID/Data monitor function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually using a active command modes function.

**Active Command Modes Procedure**

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “ABS”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
   - If there is no operation sound from the relay, motor, and solenoid after the active command mode inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.



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**DTC Table**

| DTC<br>M-MDS | System malfunction location | Page |
|---|---|---|
| B1317 | Power supply system | (See 04-02-9 DTC B1317, B1318.) |
| B1318 | Power supply system | (See 04-02-9 DTC B1317, B1318.) |
| B1342 | DSC HU/CM system | (See 04-02-11 DTC B1342, C1730.) |
| B1484 | Brake switch system | (See 04-02-11 DTC B1484, C1954.) |
| C1095 | Pump motor, motor relay system | (See 04-02-12 DTC C1095, C1096.) |
| C1096 | Pump motor, motor relay system | (See 04-02-12 DTC C1095, C1096.) |
| C1141 | LF ABS sensor rotor system | (See 04-02-14 DTC C1141, C1142, C1143, C1144.) |
| C1142 | RF ABS sensor rotor system | (See 04-02-14 DTC C1141, C1142, C1143, C1144.) |
| C1143 | LR ABS sensor rotor system | (See 04-02-14 DTC C1141, C1142, C1143, C1144.) |
| C1144 | RR ABS sensor rotor system | (See 04-02-14 DTC C1141, C1142, C1143, C1144.) |
| C1145 | RF ABS wheel-speed sensor (open circuit) system | (See 04-02-15 DTC C1145, C1155, C1165, C1175.) |
| C1148 | RF ABS wheel-speed sensor/ABS sensor rotor system | (See 04-02-17 DTC C1148, C1158, C1168, C1178.) |
| C1155 | LF ABS wheel-speed sensor (open circuit) system | (See 04-02-15 DTC C1145, C1155, C1165, C1175.) |
| C1158 | LF ABS wheel-speed sensor/ABS sensor rotor system | (See 04-02-17 DTC C1148, C1158, C1168, C1178.) |
| C1165 | RR ABS wheel-speed sensor (open circuit) system | (See 04-02-15 DTC C1145, C1155, C1165, C1175.) |
| C1168 | RR ABS wheel-speed sensor/ABS sensor rotor system | (See 04-02-17 DTC C1148, C1158, C1168, C1178.) |
| C1175 | LR ABS wheel-speed sensor (open circuit) system | (See 04-02-15 DTC C1145, C1155, C1165, C1175.) |
| C1178 | LR ABS wheel-speed sensor/ABS sensor rotor system | (See 04-02-17 DTC C1148, C1158, C1168, C1178.) |
| C1186 | Valve relay system | (See 04-02-19 DTC C1186, C1266.) |
| C1194 | LF outlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1198 | LF inlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1210 | RF outlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1214 | RF inlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1222 | ABS wheel-speed sensor (slip monitor) system | (See 04-02-20 DTC C1222.) |
| C1233 | LF ABS wheel-speed sensor (short to ground) system | (See 04-02-22 DTC C1233, C1234, C1235, C1236.) |
| C1234 | RF ABS wheel-speed sensor (short to ground) system | (See 04-02-22 DTC C1233, C1234, C1235, C1236.) |
| C1235 | RR ABS wheel-speed sensor (short to ground) system | (See 04-02-22 DTC C1233, C1234, C1235, C1236.) |
| C1236 | LR ABS wheel-speed sensor (short to ground) system | (See 04-02-22 DTC C1233, C1234, C1235, C1236.) |
| C1242 | LR outlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1246 | RR outlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1250 | LR inlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1254 | RR inlet solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1266 | Valve relay system | (See 04-02-19 DTC C1186, C1266.) |
| C1279 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| C1280 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |

| DTC<br>M-MDS | System malfunction location | Page |
|---|---|---|
| C1281 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| C1282 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| C1288 | Brake fluid pressure sensor system | (See 04-02-27 DTC C1288, C1290, C1953.) |
| C1290 | Brake fluid pressure sensor system | (See 04-02-27 DTC C1288, C1290, C1953.) |
| C1295 | Steering angle sensor system | (See 04-02-28 DTC C1295, C1307, C1937, C1938.) |
| C1306 | Steering angle sensor (abnormal initialization) system | (See 04-02-29 DTC C1306.) |
| C1307 | Steering angle sensor system | (See 04-02-28 DTC C1295, C1307, C1937, C1938.) |
| C1400 | RF traction control solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1410 | LF traction control solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1414 | Incorrect DSC HU/CM installed | (See04-02-30 DTC C1414.) |
| C1730 | DSC HU/CM system | (See 04-02-11 DTC B1342, C1730.) |
| C1937 | Steering angle sensor system | (See 04-02-28 DTC C1295, C1307, C1937, C1938.) |
| C1938 | Steering angle sensor system | (See 04-02-28 DTC C1295, C1307, C1937, C1938.) |
| C1951 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| C1952 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| C1953 | Brake fluid pressure sensor system | (See 04-02-27 DTC C1288, C1290, C1953.) |
| C1954 | Brake switch system | (See 04-02-11 DTC B1484, C1954.) |
| C1957 | RF DSC switch solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1958 | LF DSC switch solenoid valve system | (See 04-02-20 DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958.) |
| C1959 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| C1994 | DSC control system | (See 04-02-30 DTC C1994.) |
| C2768 | Combined sensor system | (See 04-02-24 DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768.) |
| U0073 | CAN system communication error | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0100 | Communication error to PCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0101 | Communication error to TCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0114 | Communication error to AWD CM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0140 | Communication error to BCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |
| U1900 | Communication error to other module | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |
| U2023 | Abnormal message from PCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].) |

**PID/DATA Monitor Table**

| PID name (definition) | Unit/Condition | Operation condition (reference) | Action | DSC HU/CM terminal |
|---|---|---|---|---|
| ABS_LAMP<br>(ABS warning light driver output state) | On/Off | • ABS warning light is illuminated: On<br>• ABS warning light is not illuminated: Off | Inspect ABS warning light. | — |
| ABS_VOLT<br>(System battery voltage value) | V | • Ignition switch at ON: **Approx. 12 V**<br>• Idling: **Approx. 14 V** | Inspect power supply circuit. (See 04-15-9 DSC HU/CM INSPECTION.) | J |

| PID name (definition) | Unit/Condition | Operation condition (reference) | Action | DSC HU/CM terminal |
|---|---|---|---|---|
| BOO_ABS (Brake pedal switch input) | On/Off | • Brake pedal depressed: On<br>• Brake pedal released: Off | Inspect the brake switch. (See 04-11-9 BRAKE SWITCH INSPECTION.) | N |
| CCNTABS (Number of continuous codes) | — | Indicates number of DTC | Perform the DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) | — |
| LAT_ACCL | G | • Vehicle stopped or driving at constant speed: **0 G**<br>• Cornering to right: Changes **0 G— positive**<br>• Cornering to left: Changes **0 G— negative** | Inspect the combined sensor. (See 04-15-16 COMBINED SENSOR INSPECTION.) | AI |
| MCYLI P | Pa, psi | • Brake pedal released: **0 Pa, 0 psi**<br>• Brake pedal depressed: Changes according to the brake fluid pressure | Inspect the brake fluid pressure sensor. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| PMP_MOTOR (Pump motor output state) | On/Off | • Pump motor activated: On<br>• Pump motor not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| RLY_PMP (Motor relay output state) | On/Off | • Relay activated: On<br>• Relay not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| RLY_VLV (Valve relay output state) | On/Off | • Valve relay is activated: On<br>• Valve relay is deactivated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| RPM (Engine speed signal input) | RPM | • Engine stopped: **0 RPM**<br>• Engine speed at 3,000 rpm: **3,000 RPM** | Inspect the PCM. (See 01-40-6 PCM INSPECTION[L3 WITH TC].) Inspect the instrument cluster. | — |
| SWA_POS | ° | • Steering wheel in neutral position (not turned): **0°**<br>• Steering wheel turned to left: Changes **0°— negative**<br>• Steering wheel turned to right: Changes **0°— positive** | Inspect the steering angle sensor. (See 09-40-7 STEERING ANGLE SENSOR INSPECTION.) | — |
| TPI | % | • Closed throttle position: **0%**<br>• Wide open throttle: Changes according to throttle valve opening angle | Inspect the throttle position sensor. | — |
| V_LF_INL (Left front inlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_LF_OTL (Left front outlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_LR_INL (Left rear inlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_LR_OTL (Left rear outlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_RF_INL (Right front inlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |

| PID name (definition) | Unit/Condition | Operation condition (reference) | Action | DSC HU/CM terminal |
|---|---|---|---|---|
| V_RF_OTL (Right front outlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_RR_INL (Right rear inlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_RR_OTL (Right rear outlet solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_STB_L (LF stability control solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_STB_R (RF stability control solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_TRC_L (LF traction control solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| V_TRC_R (RF traction control solenoid valve output state) | On/Off | • Solenoid valve activated: On<br>• Solenoid valve not activated: Off | Inspect the DSC HU/CM. (See 04-15-4 DSC SYSTEM INSPECTION.) | — |
| WSPD_LF (Left front ABS wheel-speed sensor input) | KPH, MPH | • Vehicle stopped: **0 KPH, 0 MPH**<br>• Vehicle running: vehicle speed | Inspect the ABS wheel-speed sensor. (See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.) | F, E |
| WSPD_LR (Left rear ABS wheel-speed sensor input) | KPH, MPH | • Vehicle stopped: **0 KPH, 0 MPH**<br>• Vehicle running: Vehicle speed | Inspect the ABS wheel-speed sensor. (See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].) (See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].) | G, H |
| WSPD_RF (Right front ABS wheel-speed sensor input) | KPH, MPH | • Vehicle stopped: **0 KPH, 0 MPH**<br>• Vehicle running: vehicle speed | Inspect the ABS wheel-speed sensor. (See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.) | M, O |
| WSPD_RR (Right rear ABS wheel-speed sensor input) | KPH, MPH | • Vehicle stopped: **0 KPH, 0 MPH**<br>• Vehicle running: Vehicle speed | Inspect the ABS wheel-speed sensor. (See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].) (See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].) | I, L |
| YAW_RATE | °/s | • Vehicle stopped or driving straight: **0 °/s**<br>• Cornering to left: Changes **0 °/s— negative**<br>• Cornering to right: Changes **0 °/s— positive** | Inspect the combined sensor. (See 04-15-16 COMBINED SENSOR INSPECTION.) | AA |

**Active Command Modes Table**

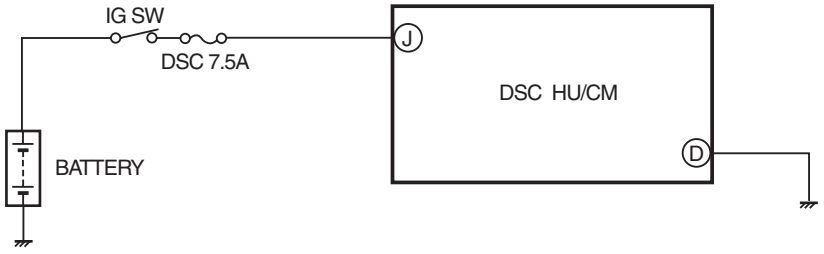
| Command name | Output part | Operation | Operating condition |
|---|---|---|---|
| LATACCEL | Combined sensor (lateral acceleration) initialization | FALSE/TRUE | Ignition switch at ON |
| PMP_MOTOR | Pump motor | On/Off | |
| SAS_CAL | Steering angle sensor initialization | FALSE/TRUE | |
| STAB_IND | DSC indicator light | On/Off | |
| TRAC OFF | TCS OFF light | | |
| V_LF_INL | LF inlet solenoid valve | | |
| V_LF_OTL | LF outlet solenoid valve | | |
| V_LR_INL | LR inlet solenoid valve | | |
| V_LR_OTL | LR outlet solenoid valve | | |
| V_RF_INL | RF inlet solenoid valve | | |
| V_RF_OTL | RF outlet solenoid valve | | |
| V_RR_INL | RR inlet solenoid valve | | |
| V_RR_OTL | RR outlet solenoid valve | | |
| V_STB_L | LF stability control solenoid valve | | |
| V_STB_R | RF stability control solenoid valve | | |
| V_TRC_L | LF traction control solenoid valve | | |
| V_TRC_R | RF traction control solenoid valve | | |
| YAWRATE | Combined sensor (yaw rate) initialization | | |



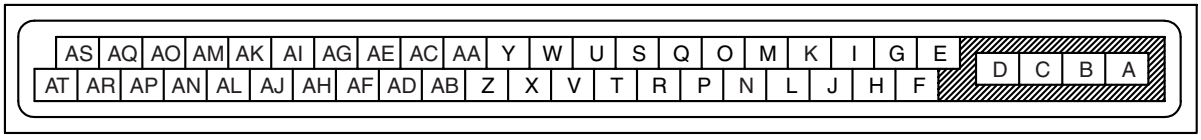
**DTC B1317, B1318**

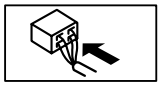
id040200800300

| DTC B1317, B1318 | Power supply system |
|---|---|
| **DETECTION CONDITION** | • B1317<br>— The voltage at DSC HU/CM terminal J is **16.8 V or more**.<br>• B1318<br>— The vehicle speed exceeds **6 km/h** and the voltage at ABS HU/CM terminal J is less than **9.6 V** |
| **POSSIBLE CAUSE** | • DSC 7.5A fuse malfunction<br>• Open circuit or short to ground in the wiring harness between the DSC HU/CM terminal J and the battery<br>• Open circuit or faulty ground in the wiring harness between the DSC HU/CM terminal D and the body ground<br>• Battery deterioration<br>• Generator malfunction<br>• Poor connection at connectors (female terminal) |




DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT BATTERY VOLTAGE**<br>• Is the battery terminal voltage normal? | Yes | Make sure that battery terminal connection is normal.<br>Go to the next step. |
| | | No | Charge or replace the battery, then go to Step 6.<br>(See 01-17-4 BATTERY RECHARGING[L3 WITH TC].)<br>(See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].) |
| 2 | **INSPECT BATTERY GRAVITY**<br>• Is battery specific gravity as specified? | Yes | Go to the next step. |
| | | No | Replace the battery, then go to Step 6.<br>(See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| 3 | **INSPECT CHARGING SYSTEM**<br>• Are the generator and drive belt tensions normal? | Yes | Go to the next step. |
| | | No | Replace generator and/or drive belt as necessary, then go to Step 6.<br>(See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 01-17-4 GENERATOR REMOVAL/INSTALLATION[L3 WITH TC].) |
| 4 | **INSPECT ABS HU/CM POWER SUPPLY FOR OPEN CIRCUIT**<br>• Start the engine.<br>• Measure the voltage between DSC HU/CM terminal J and ground.<br>• Is the voltage **approx. 10 V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between the DSC HU/CM and ground, then go to Step 6. |
| 5 | **INSPECT DSC HU/CM GROUND FOR POOR GROUND OR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Measure the resistance between ground and DSC HU/CM terminal D.<br>• Is the resistance **within 0— 1 ohm**? | Yes | Go to the next step. |
| | | No | If there is no continuity:<br>• Repair or replace the wiring harness for open circuit between the DSC HU/CM and ground, then go to the next step.<br>If the resistance is not **within 0— 1 ohm**:<br>• Repair or replace the wiring harness for poor ground, then go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Is the same DTC present? | Yes | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

### DTC B1342, C1730

id040200800400

| DTC B1342, C1730 | DSC HU/CM system |
|---|---|
| DETECTION CONDITION | • B1342<br>— The DSC HU/CM on-board diagnostic function detects control module malfunction.<br>• C1730<br>— Excess current is detected in the power supply circuit of the ABS wheel-speed sensor. |
| POSSIBLE CAUSE | • DSC HU/CM internal malfunction |

**Diagnostic procedure**

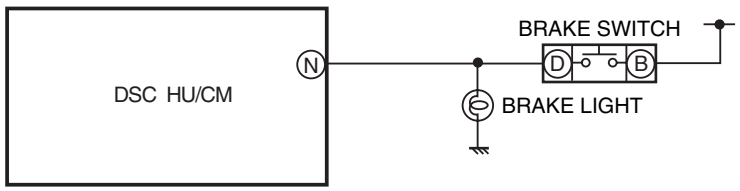
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY CURRENT STATUS OF MALFUNCTION**<br>• Clear the DTC from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Is the same DTC present? | Yes | Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |



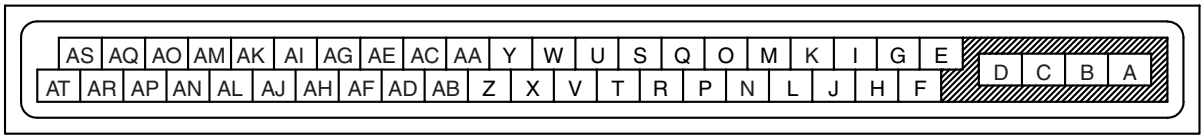
### DTC B1484, C1954

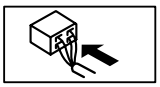
id040200800500

| DTC B1484, C1954 | Brake switch system |
|---|---|
| DETECTION CONDITION | • B1484<br>— Open circuit in the wiring harness between the DSC HU/CM terminal and the brake switch terminal<br>• C1954<br>— Brake switch ON signal is not input when the brake fluid pressure sensor signal reaches the specified value.<br>— Brake switch ON signal is input even if the signal from the brake fluid pressure sensor is less than the specification. |
| POSSIBLE CAUSE | • Brake switch malfunction<br>• Open circuit in the wiring harness between the DSC HU/CM terminal N and the brake switch terminal D |

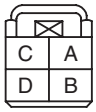


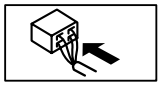

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



BRAKE SWITCH WIRING HARNESS-SIDE CONNECTOR



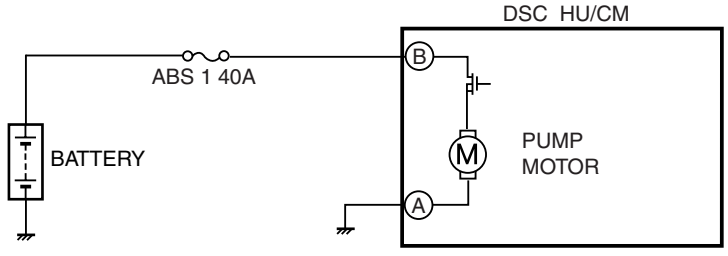
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DSC HU/CM TO BRAKE SWITCH FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Disconnect the DSC HU/CM and brake switch connector.<br>• Inspect for continuity DSC HU/CM terminal N and brake switch terminal D.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM and brake switch, then go to the next step. |
| 2 | **INSPECT BRAKE SWITCH**<br>• Inspect the brake switch. (See 04-11-9 BRAKE SWITCH INSPECTION.)<br>• Is the brake switch normal? | Yes | Go to the next step. |
| | | No | Replace the brake switch, then go to the next step. (See 04-11-6 BRAKE PEDAL REMOVAL/INSTALLATION.) |
| 3 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Are the same DTCs present? | Yes | Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTC present? | Yes | Go to the applicable DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

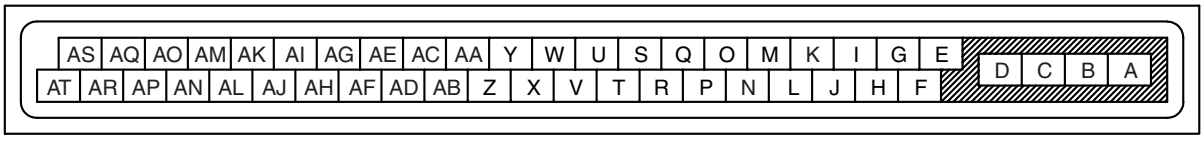
**DTC C1095, C1096**

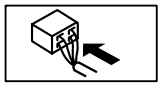
id040200800800

| DTC C1095, C1096 | Pump motor, motor relay system |
|---|---|
| **DETECTION CONDITION** | • C1095<br>— When the pump motor monitor voltage remains at **2.0 V or more** for **1 s**<br>• C1096<br>— When the difference between the battery power supply voltage and pump motor power supply voltage remains at **4.0 V or more** for **0.1 s** or more while the pump motor is operating<br>— ABS motor monitor OFF signal is input within specified time limit when the motor signal is switched from ON to OFF by ABS HU/CM. |
| **POSSIBLE CAUSE** | • ABS 1 40A fuse malfunction<br>• Open or short to ground circuit in the wiring harness between the battery and the DSC HU/CM terminal B<br>• Open circuit in the wiring harness between the DSC HU/CM terminal A and the body ground<br>• Open or short circuit in the DSC HU/CM internal motor relay, or stuck motor relay<br>• Open or short circuit in the DSC HU/CM internal motor, or frozen motor<br>• Fail-safe relay malfunction<br>• Poor connection at connectors (female terminal) |




DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT ABS FUSE CONDITION**<br>• Is the ABS 1 40A fuse normal? | Yes | Go to the next step. |
| | | No | Replace the fuse, then go to Step 5. |
| 2 | **INSPECT MOTOR RELAY POWER SUPPLY FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Disconnect DSC HU/CM connector.<br>• Turn the ignition switch to the ON position (engine off).<br>• Measure voltage between DSC HU/CM terminal B (harness-side) and ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between battery positive terminal and DSC HU/CM terminal B, then go to Step 5. |
| 3 | **INSPECT PUMP MOTOR GROUND FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal A (harness-side) and ground.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM terminal A and ground, then go to Step 5. |
| 4 | **VERIFY PUMP MOTOR OPERATION**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Turn the ignition switch to the ON position (engine off).<br>• Access PMP_MOTOR active command modes using the M-MDS.<br>• Does the pump motor operate? | Yes | Go to the next step. |
| | | No | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Gradually slow down and stop the vehicle.<br>• Is the same DTC present? | Yes | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

## DTC C1141, C1142, C1143, C1144

id040200801000

| | | |
|---|---|---|
| DTC | C1141<br>C1142<br>C1143<br>C1144 | LF ABS sensor rotor system<br>RF ABS sensor rotor system<br>LR ABS sensor rotor system<br>RR ABS sensor rotor system |
| DETECTION CONDITION | • Periodic abnormality is detected in the signal wave pattern from the ABS wheel-speed sensors. | |
| POSSIBLE CAUSE | • ABS wheel-speed sensor malfunction<br>• ABS sensor rotor malfunction (foreign material adhering)<br>• Improper installation of ABS wheel-speed sensor and/or sensor rotor<br>• Excessive clearance between the ABS wheel-speed sensor and sensor rotor | |

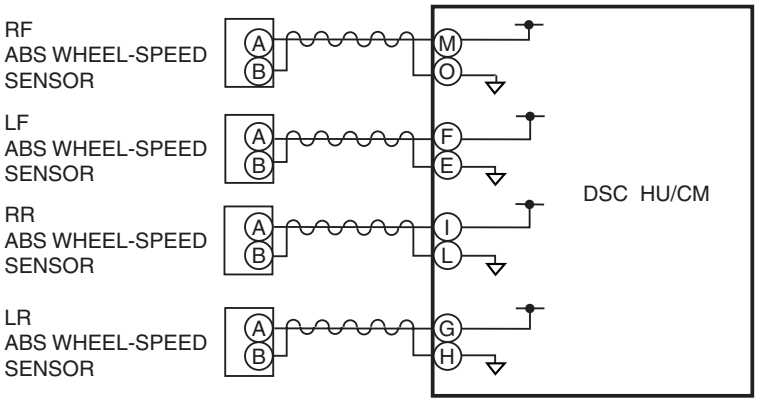
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PID FOR ABS WHEEL-SPEED SENSOR OUTPUT ERROR USING M-MDS**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Select the following PIDs using the M-MDS:<br>WSPD_LF<br>WSPD_LR<br>WSPD_RF<br>WSPD_RR<br>• Drive the vehicle.<br>• Verify that the vehicle speeds detected by the four ABS wheel-speed sensors are approximately the same.<br>• Are the vehicle speeds approximately the same? | Yes | Go to Step 4. |
| | | No | Go to the next step. |
| 2 | **INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE.**<br>• Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor.<br>(See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].)<br>• Is the clearance normal?<br>**Clearance**<br>**Front: 0.7— 1.5 mm {0.028— 0.059 in}**<br>**Rear: 0.3— 1.1 mm {0.012— 0.043 in}** | Yes | Go to the next step. |
| | | No | Replace the ABS wheel-speed sensor, then go to Step 4.<br>(See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].) |
| 3 | **VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION**<br>• Is the result normal? | Yes | Go to the next step. |
| | | No | Replace the front drive shaft, rear wheel hub component (2WD) or rear drive shaft (AWD), then go to the next step.<br>(See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)<br>(See 03-12-3 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD].)<br>(See 03-13-20 REAR DRIVE SHAFT REMOVAL/INSTALLATION.) |
| 4 | **VERIFY THAT THE SAME DTC IS NOT PRESENT**<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Are the same DTCs present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY THAT NO OTHER DTCS ARE PRESENT**<br>• Are any other DTCs output? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

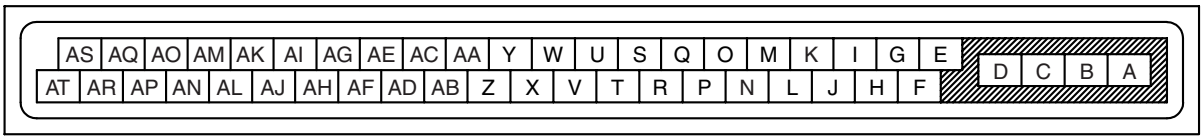
## DTC C1145, C1155, C1165, C1175

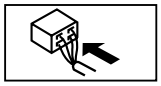
id040200801100

| | | |
|---|---|---|
| DTC | C1145<br>C1155<br>C1165<br>C1175 | **RF ABS wheel-speed sensor (open circuit) system**<br>**LF ABS wheel-speed sensor (open circuit) system**<br>**RR ABS wheel-speed sensor (open circuit) system**<br>**LR ABS wheel-speed sensor (open circuit) system** |
| **DETECTION CONDITION** | • Open circuit has been detected in the ABS wheel-speed sensor or the ABS wheel-speed sensor wiring harness on any of the four vehicle wheels. | |
| **POSSIBLE CAUSE** | • Open circuit in the wiring harness between the following DSC HU/CM terminal and the ABS wheel-speed sensor terminal:<br>— DSC HU/CM terminal M— RF ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal O— RF ABS wheel-speed sensor terminal B<br>— DSC HU/CM terminal F— LF ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal E— LF ABS wheel-speed sensor terminal B<br>— DSC HU/CM terminal I— RR ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal L— RR ABS wheel-speed sensor terminal B<br>— DSC HU/CM terminal G— LR ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal H— LR ABS wheel-speed sensor terminal B<br>• ABS wheel-speed sensor malfunction<br>• Poor connection at connectors (female terminal) | |



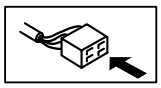

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT REAR



04-02

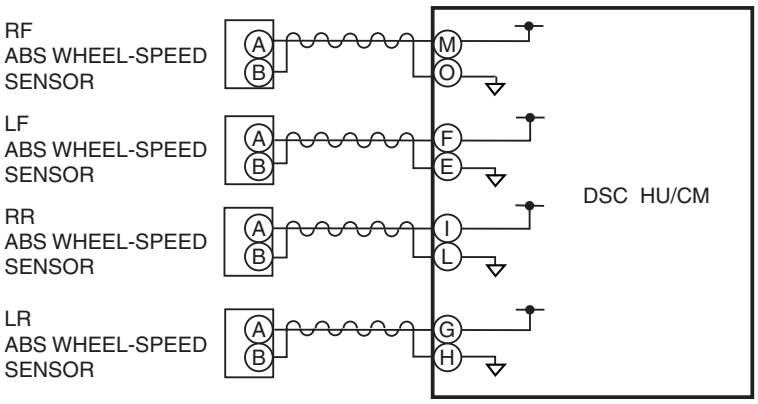
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL- SPEED SENSOR USING M-MDS**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Select the following PIDs using the M-MDS:<br>WSPD_LF<br>WSPD_LR<br>WSPD_RF<br>WSPD_RR<br>• Drive the vehicle.<br>• Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor.<br>• Are the wheel-speed signals transmitted? | Yes | Go to Step 3. |
| | | No | Go to the next step. |
| 2 | **INSPECT FOR OPEN CIRCUIT IN WIRING HARNESS BETWEEN DSC HU/CM AND ABS WHEEL-SPEED SENSOR**<br>• Turn the ignition switch off.<br>• Disconnect the DSC HU/CM connector and ABS wheel-speed sensor.<br>• Inspect for continuity in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and DSC HU/CM connectors.<br>— RF ABS wheel-speed sensor: M— A<br>— RF ABS wheel-speed sensor: O— B<br>— LF ABS wheel-speed sensor: F— A<br>— LF ABS wheel-speed sensor: E— B<br>— RR ABS wheel-speed sensor: I— A<br>— RR ABS wheel-speed sensor: L— B<br>— LR ABS wheel-speed sensor: G— A<br>— LR ABS wheel-speed sensor: H— B<br>• Is there continuity? | Yes | Replace the ABS wheel-speed sensor, then go to the next step.<br>(See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].) |
| | | No | Repair or replace the wiring harness, then go to the next step. |
| 3 | **VERIFY THAT THE SAME DTC IS NOT PRESENT**<br>• Clear the DTCs from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Are the same DTCs present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **VERIFY THAT NO OTHER DTCS ARE PRESENT**<br>• Are any other DTCs output? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

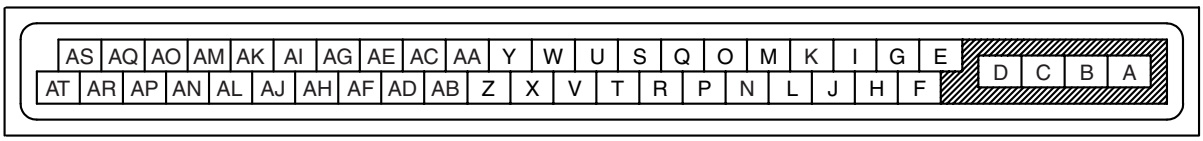
## DTC C1148, C1158, C1168, C1178

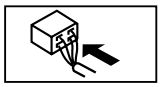
id040200801200

| | | |
|---|---|---|
| DTC | C1148<br>C1158<br>C1168<br>C1178 | **RF ABS wheel-speed sensor/ABS sensor rotor system**<br>**LF ABS wheel-speed sensor/ABS sensor rotor system**<br>**RR ABS wheel-speed sensor/ABS sensor rotor system**<br>**LR ABS wheel-speed sensor/ABS sensor rotor system** |
| **DETECTION CONDITION** | | • Vehicle wheel speed signals of any of the four vehicle wheels indicate abnormal acceleration that exceeds specification.<br>• Vehicle wheel speed signals of any of the four vehicle wheels indicate speed that exceeds specification. |
| **POSSIBLE CAUSE** | | • ABS wheel-speed sensor malfunction (low output, metal shavings on sensor)<br>• ABS sensor rotor malfunction (chipping of sensor rotor teeth)<br>• Poor installation of ABS wheel-speed sensor and/or sensor rotor<br>• Excessive clearance between the ABS wheel-speed sensor and sensor rotor |



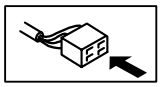

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT REAR



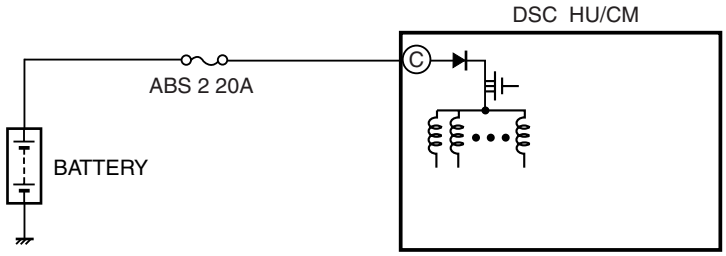
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PID FOR ABNORMAL OUTPUT FROM ABS WHEEL-SPEED SENSOR USING M-MDS**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Select the following PIDs using the M-MDS:<br>WSPD_LF<br>WSPD_LR<br>WSPD_RF<br>WSPD_RR<br>• Start the engine and drive the vehicle.<br>• Verify that the PIDs of the four ABS wheel-speed sensors correspond approximately.<br>• Do the vehicle speeds correspond? | Yes | Go to Step 4. |
| | | No | If there is a difference in speeds of the four wheels, go to the next step. |
| 2 | **INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE.**<br>• Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor.<br>(See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].)<br>• Is the clearance normal?<br>**Clearance**<br>**Front: 0.7— 1.5 mm {0.028— 0.059 in}**<br>**Rear: 0.3— 1.1 mm {0.012— 0.043 in}** | Yes | Go to the next step. |
| | | No | Replace the ABS wheel-speed sensor, then go to Step 4.<br>(See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].) |
| 3 | **VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION**<br>• Is the result normal? | Yes | Go to the next step. |
| | | No | Replace the front drive shaft, rear wheel hub component (2WD) or rear drive shaft (AWD), then go to the next step.<br>(See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)<br>(See 03-12-3 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD].)<br>(See 03-13-20 REAR DRIVE SHAFT REMOVAL/INSTALLATION.) |
| 4 | **VERIFY THAT THE SAME DTC IS NOT PRESENT**<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Are the same DTCs present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY THAT NO OTHER DTCS ARE PRESENT**<br>• Are any other DTCs output? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

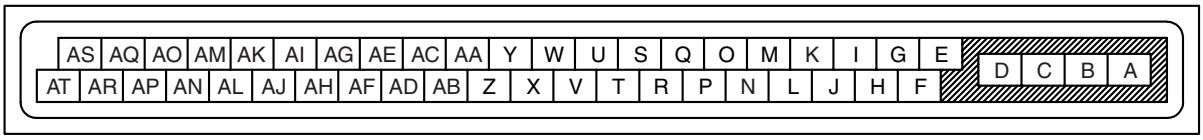
## DTC C1186, C1266

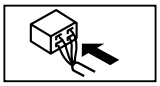
id040200801300

| DTC C1186, C1266 | Valve relay system |
|---|---|
| DETECTION CONDITION | • C1186<br>— DSC HU/CM internal valve relay remains OFF when valve relay ON is commanded.<br>• C1266<br>— DSC HU/CM internal valve relay remains ON (stuck) when valve relay OFF is commanded. |
| POSSIBLE CAUSE | • ABS 2 20A fuse malfunction<br>• Open circuit or short to ground in the wiring harness between the battery and the DSC HU/CM terminal C<br>• Open or short circuit in the DSC HU/CM internal valve relay, or stuck valve relay<br>• Poor connection at connectors (female terminal) |




DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DSC FUSE CONDITION**<br>• Is the ABS 2 20A fuse normal? | Yes | Go to the next step. |
| | | No | Replace the fuse, then go to Step 3. |
| 2 | **INSPECT VALVE RELAY POWER SUPPLY FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Disconnect DSC HU/CM connector.<br>• Turn the ignition switch to the ON position (engine off).<br>• Measure voltage between DSC HU/CM terminal C (harness-side) and ground.<br>• Is voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between battery positive terminal and DSC HU/CM terminal C, then go to the next step. |
| 3 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Is the same DTC present? | Yes | Replace the DSC HU/CM, then go to next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

**DTC C1194, C1198, C1210, C1214, C1242, C1246, C1250, C1254, C1400, C1410, C1957, C1958**

id040200801400

| | | |
|---|---|---|
| **DTC** | **C 1194** | **LF outlet solenoid valve system** |
| | **C 1198** | **LF inlet solenoid valve system** |
| | **C 1210** | **RF outlet solenoid valve system** |
| | **C 1214** | **RF inlet solenoid valve system** |
| | **C 1242** | **LR outlet solenoid valve system** |
| | **C 1246** | **RR outlet solenoid valve system** |
| | **C 1250** | **LR inlet solenoid valve system** |
| | **C 1254** | **RR inlet solenoid valve system** |
| | **C 1400** | **RF traction control solenoid valve system** |
| | **C 1410** | **LF traction control solenoid valve system** |
| | **C 1957** | **RF stability control solenoid valve system** |
| | **C 1958** | **LF stability control solenoid valve system** |
| **DETECTION CONDITION** | • Solenoid valve operation does not correspond to solenoid ON/OFF commands from the DSC HU/CM. | |
| **POSSIBLE CAUSE** | • Open or short circuit in the DSC HU/CM internal solenoid valves<br>• Solenoid valve malfunction<br>• Poor connection at connectors (female terminal) | |

**Diagnostic procedure**

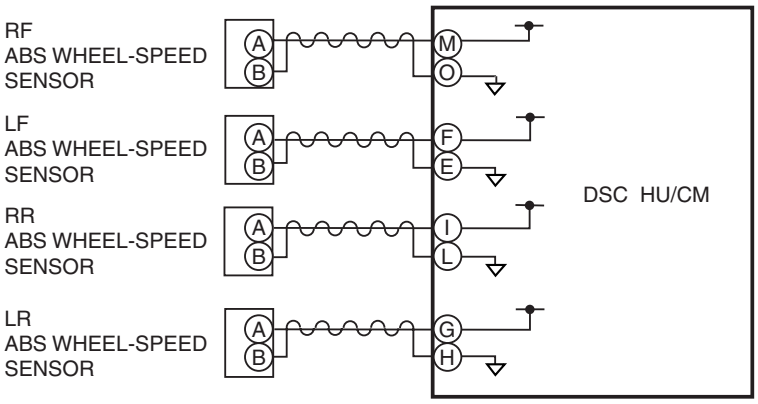
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY SOLENOID VALVE OPERATION**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Turn the ignition switch to the ON position (engine off).<br>• Access the active command mode for the solenoid valve using the M-MDS.<br>• Does the solenoid valve operate? | Yes | Go to the next step. |
| | | No | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| 2 | **VERIFY DTC TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Gradually slow down and stop vehicle.<br>• Are the same DTCs present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 3 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

**DTC C1222**

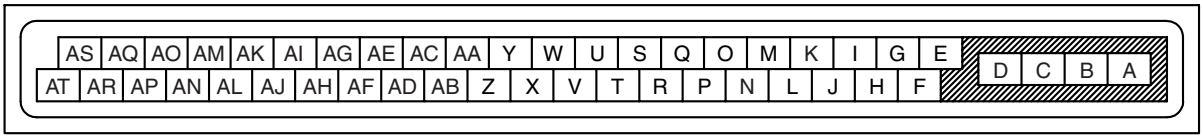
id040200801500

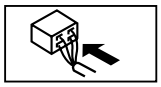
**Note**
- DTC C1222 will be detected when a malfunctioning ABS wheel-speed sensor cannot be specified.

| | | |
|---|---|---|
| **DTC C1222** | | **ABS wheel-speed sensor (slip monitor) system** |
| **DETECTION CONDITION** | • Difference between any vehicle wheel speeds exceeds specification when driving at a constant speed.<br>• ABS control operates for **60 s or more.** | |
| **POSSIBLE CAUSE** | • ABS wheel-speed sensor malfunction (low output, metal shavings on sensor)<br>• ABS sensor rotor malfunction (chipping of sensor rotor teeth)<br>• Poor installation of ABS wheel-speed sensor and/or sensor rotor (If the sensor rotor is installed at an angle, it may cause output of abnormal wave pattern at high speeds.)<br>• Excessive clearance between the ABS wheel-speed sensor and sensor rotor | |



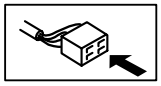

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT REAR



**Diagnostic procedure**

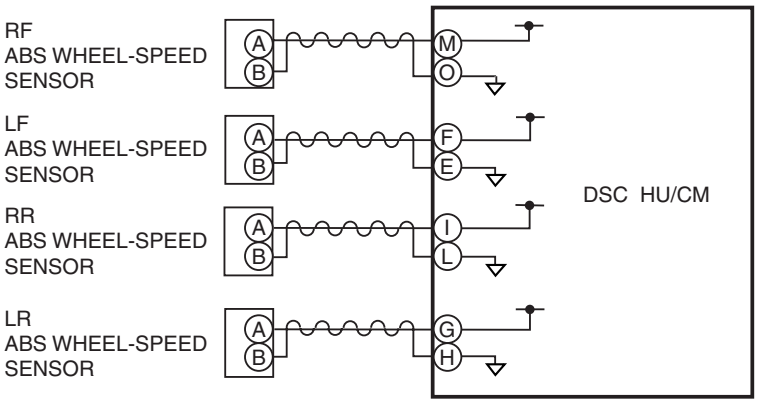
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PID FOR ABS WHEEL-SPEED SENSOR OUTPUT ERROR USING M-MDS**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Select the following PIDs using the M-MDS:<br>WSPD_LF<br>WSPD_LR<br>WSPD_RF<br>WSPD_RR<br>• Drive the vehicle.<br>• Verify that the vehicle speeds detected by the four ABS wheel-speed sensors are approximately the same.<br>• Are the vehicle speeds approximately the same? | Yes | Go to Step 4. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT IF MALFUNCTION OCCURRED DUE TO IMPROPER SENSOR CLEARANCE.**<br>• Inspect the clearance between the ABS wheel-speed sensor and the ABS sensor rotor.<br>(See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].)<br>• Is the clearance normal?<br>**Clearance**<br>**Front: 0.7— 1.5 mm {0.028— 0.059 in}**<br>**Rear: 0.3— 1.1 mm {0.012— 0.043 in}** | Yes | Go to the next step. |
| | | No | Replace the ABS wheel-speed sensor, then go to Step 4.<br>(See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].) |
| 3 | **VISUALLY INSPECT ABS SENSOR ROTOR FOR FOREIGN MATERIAL ADHERING OR IMPROPER INSTALLATION**<br>• Is the result normal? | Yes | Go to the next step. |
| | | No | Replace the front drive shaft, rear wheel hub component (2WD) or rear drive shaft (AWD), then go to the next step.<br>(See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)<br>(See 03-12-3 WHEEL HUB COMPONENT REMOVAL/INSTALLATION[2WD].)<br>(See 03-13-20 REAR DRIVE SHAFT REMOVAL/INSTALLATION.) |
| 4 | **VERIFY THAT THE SAME DTC IS NOT PRESENT**<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Are the same DTCs present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY THAT NO OTHER DTCS ARE PRESENT**<br>• Are any other DTCs output? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

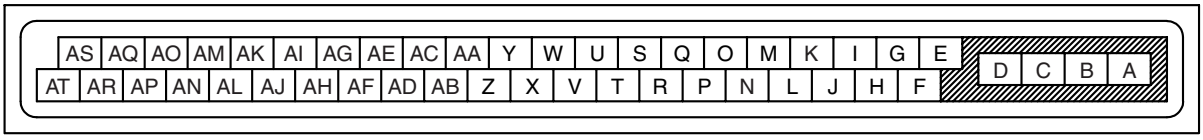
### DTC C1233, C1234, C1235, C1236

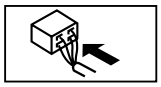
id040200801600

| | | |
|---|---|---|
| **DTC** | **C1233**<br>**C1234**<br>**C1235**<br>**C1236** | **LF ABS wheel-speed sensor (short to ground) system**<br>**RF ABS wheel-speed sensor (short to ground) system**<br>**RR ABS wheel-speed sensor (short to ground) system**<br>**LR ABS wheel-speed sensor (short to ground) system** |
| **DETECTION CONDITION** | • The vehicle wheel speed of any of the four vehicle wheels is **2.75 km/h {1.71 mph}** or less when driving at the specified vehicle speed or more. | |
| **POSSIBLE CAUSE** | • Short to ground in the wiring harness between the following DSC HU/CM terminal and the ABS wheel-speed sensor terminal:<br>— DSC HU/CM terminal M— RF ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal O— RF ABS wheel-speed sensor terminal B<br>— DSC HU/CM terminal F— LF ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal E— LF ABS wheel-speed sensor terminal B<br>— DSC HU/CM terminal I— RR ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal L— RR ABS wheel-speed sensor terminal B<br>— DSC HU/CM terminal G— LR ABS wheel-speed sensor terminal A<br>— DSC HU/CM terminal H— LR ABS wheel-speed sensor terminal B<br>• ABS wheel-speed sensor malfunction<br>• Poor connection at connectors (female terminal) | |



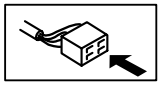

DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



ABS WHEEL-SPEED SENSOR WIRING HARNESS-SIDE CONNECTOR

FRONT REAR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PID TO VERIFY THAT WHEEL SPEED-SIGNALS ARE TRANSMITTED FROM ABS WHEEL- SPEED SENSOR USING M-MDS**<br>• Turn the ignition switch off.<br>• Connect the M-MDS to the DLC-2.<br>• Select the following PIDs using the M-MDS:<br>WSPD_LF<br>WSPD_LR<br>WSPD_RF<br>WSPD_RR<br>• Drive the vehicle.<br>• Verify that the wheel speed-signals are transmitted from each ABS wheel-speed sensor.<br>• Are the wheel-speed signals transmitted? | Yes | Go to Step 3. |
| | | No | Go to the next step. |

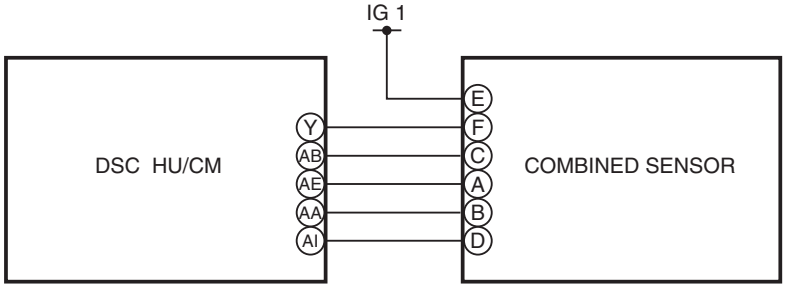
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT FOR OPEN CIRCUIT IN WIRING HARNESS BETWEEN DSC HU/CM AND ABS WHEEL-SPEED SENSOR**<br>• Turn the ignition switch off.<br>• Disconnect the DSC HU/CM connector and ABS wheel-speed sensor.<br>• Inspect for continuity in the wiring harness between the following ABS wheel-speed sensor connectors on the vehicle wiring harness-side and DSC HU/CM connectors.<br>— RF ABS wheel-speed sensor: M— A<br>— RF ABS wheel-speed sensor: O— B<br>— LF ABS wheel-speed sensor: F— A<br>— LF ABS wheel-speed sensor: E— B<br>— RR ABS wheel-speed sensor: I— A<br>— RR ABS wheel-speed sensor: L— B<br>— LR ABS wheel-speed sensor: G— A<br>— LR ABS wheel-speed sensor: H— B<br>• Is there continuity? | Yes | Replace the ABS wheel-speed sensor, then go to the next step.<br>(See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].) |
| | | No | Repair or replace the wiring harness, then go to the next step. |
| 3 | **VERIFY THAT THE SAME DTC IS NOT PRESENT**<br>• Clear the DTCs from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Are the same DTCs present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **VERIFY THAT NO OTHER DTCS ARE PRESENT**<br>• Are any other DTCs output? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

### DTC C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768

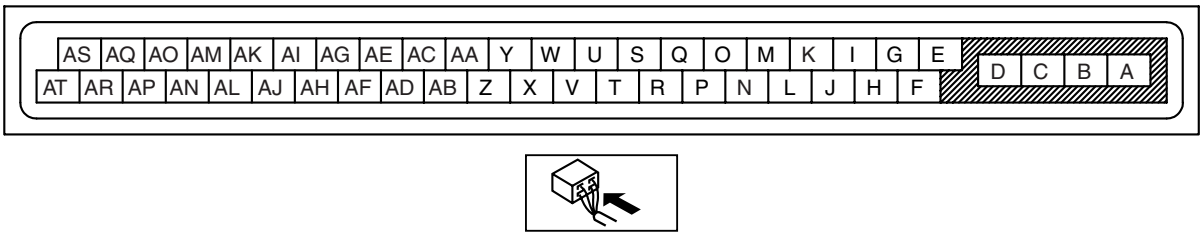
id040200801700

| DTC | C1279, C1280, C1281, C1282, C1951, C1952, C1959, C2768 | Combined sensor system |
|---|---|---|
| DETECTION CONDITION | • C1279<br>— The yaw rate value from the combined sensor (yaw rate part) exceeds specification while the vehicle is stopped or while accelerating from a standstill.<br>• C1280<br>— The difference between the yaw rate value calculated by each sensor and the yaw rate value from the combined sensor (yaw rate part) exceeds specification.<br>• C1281<br>— The difference between the lateral-G value calculated by each sensor and the lateral-G value from the combined sensor (lateral-G part) exceeds specification.<br>• C1282<br>— Specified signal pattern from combined sensor has not output after the ignition switch is turned to the ON position.<br>• C1951<br>— The monitor voltage from the combined sensor (lateral-G part) is not within specification.<br>• C1952<br>— The monitor voltage from the combined sensor (yaw rate part) is not within specification.<br>• C1959<br>— The lateral-G value from the combined sensor (lateral-G part) exceeds specification.<br>• C2768<br>— There is an abnormality in the signal from the combined sensor (yaw rate part). | |

| | |
|---|---|
| **POSSIBLE CAUSE** | • Open circuit in the wiring harness between ignition switch and combined sensor terminal E or short circuit to ground<br>• Open circuit in the wiring harness between DSC HU/CM terminal Y and combined sensor terminal F or short circuit to ground<br>• Open circuit in the wiring harness between DSC HU/CM terminal AB and combined sensor terminal C or short circuit to ground<br>• Open circuit in the wiring harness between DSC HU/CM terminal AE and combined sensor terminal A or short circuit to ground<br>• Open circuit in the wiring harness between DSC HU/CM terminal AA and combined sensor terminal B or short circuit to ground<br>• Open circuit in the wiring harness between DSC HU/CM terminal AI and combined sensor terminal D<br>• Combined sensor malfunction<br>• Poor connection at connectors (female terminal) |

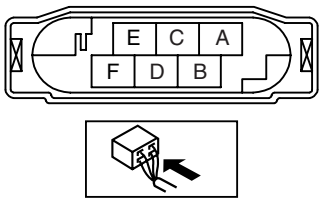



DSC HU/CM WIRING HARNESS-SIDE CONNECTOR






COMBINED SENSOR WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMBINED SENSOR POWER SUPPLY FOR OPEN CIRCUIT**<br>• Turn the ignition switch to the ON position (engine off).<br>• Measure voltage between combined sensor terminal E (harness-side) and ground.<br>• Is the voltage **B+?** | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between combined sensor terminal E and ignition switch, then go to Step 12. |
| 2 | **INSPECT COMBINED SENSOR GROUND FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Disconnect DSC HU/CM and combined sensor connectors.<br>• Inspect for continuity between DSC HU/CM terminal Y (harness-side) and combined sensor terminal F (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM terminal Y and combined sensor terminal F, then go to Step 12. |
| 3 | **INSPECT COMBINED SENSOR (YAW RATE PART) SIGNAL FOR OPEN CIRCUIT**<br>• Inspect for continuity between DSC HU/CM terminal AA (harness-side) and combined sensor terminal B (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM terminal AA and combined sensor terminal B, then go to Step 12. |
| 4 | **INSPECT COMBINED SENSOR (YAW RATE PART) SIGNAL FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal AA (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for short to ground between DSC HU/CM terminal AA and combined sensor terminal B, then go to Step 12. |
| | | No | Go to the next step. |
| 5 | **INSPECT COMBINED SENSOR (LATERAL-G PART) SIGNAL FOR OPEN CIRCUIT**<br>• Inspect for continuity between DSC HU/CM terminal AI (harness-side) and combined sensor terminal D (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM terminal AI and combined sensor terminal D, then go to Step 12. |
| 6 | **INSPECT COMBINED SENSOR (LATERAL-G PART) SIGNAL FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal AI (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for short to ground between DSC HU/CM terminal AI and combined sensor terminal D, then go to Step 12. |
| | | No | Go to the next step. |
| 7 | **INSPECT REFERENCE SIGNAL FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal AE (harness-side) and combined sensor terminal A (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM terminal AE and combined sensor terminal A, then go to Step 12. |
| 8 | **INSPECT REFERENCE SIGNAL FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal AE (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for short to ground between DSC HU/CM terminal AE and combined sensor terminal A, then go to Step 12. |
| | | No | Go to the next step. |
| 9 | **INSPECT TEST SIGNAL FOR OPEN CIRCUIT**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal AB (harness-side) and combined sensor terminal C (harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for open circuit between DSC HU/CM terminal AB and combined sensor terminal C, then go to Step 12. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **INSPECT TEST SIGNAL FOR SHORT TO GROUND**<br>• Turn the ignition switch off.<br>• Inspect for continuity between DSC HU/CM terminal AB (harness-side) and ground.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for short to ground between DSC HU/CM terminal AB and combined sensor terminal C, then go to Step 12. |
| | | No | Go to the next step. |
| 11 | **INSPECT COMBINED SENSOR**<br>• Inspect the combined sensor. (See 04-15-16 COMBINED SENSOR INSPECTION.)<br>• Is the combined sensor normal? | Yes | Go to the next step. |
| | | No | Replace the combined sensor, then go to the next step. (See 04-15-15 COMBINED SENSOR REMOVAL/ INSTALLATION.) |
| 12 | **VERIFY DTC TROUBLESHOOTING COMPLETED.**<br>• Clear the DTC from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Are the same DTCs present? | Yes | Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 13 | **VERIFY AFTER REPAIR PROCEDURE.**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |



### DTC C1288, C1290, C1953

id040200801800

| DTC C1288, C1290, C1953 | Brake fluid pressure sensor system |
|---|---|
| **DETECTION CONDITION** | • C1288<br>— The pressure from the brake fluid pressure sensor when the system starts up is not within specification.<br>• C1290<br>— The standard brake fluid pressure calculated in the DSC HU/CM when not braking exceeds the specification.<br>• C1953<br>— The output voltage from the brake fluid pressure sensor is not within specification. |
| **POSSIBLE CAUSE** | • Open or short circuit in the brake fluid pressure sensor circuit in the DSC HU/CM<br>• Malfunction in the brake fluid pressure sensor |

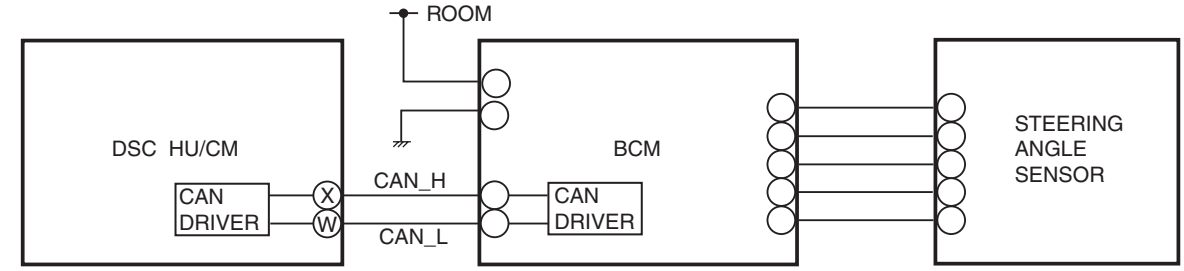
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY NO ABNORMALITY ON BRAKE FLUID PRESSURE SENSOR**<br>• Clear the DTCs from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more.**<br>• Are the same DTCs present? | Yes | Replace the DSC HU/CM, then go to the next step. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **VERIFY THAT NO OTHER DTCS ARE PRESENT**<br>• Are any other DTCs output? | Yes | Go to the applicable DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

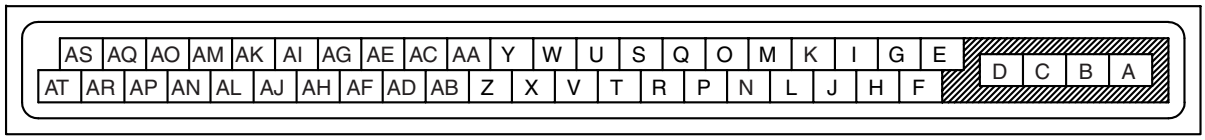
## DTC C1295, C1307, C1937, C1938

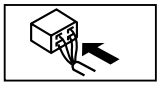
id040200805000

| DTC C1295, C1307, C1937, C1938 | Steering angle sensor system |
|---|---|
| DETECTION CONDITION | • C1295<br>— The steering angle sensor detects an internal abnormality.<br>• C1307<br>— The steering angle sensor detects an abnormality in the signal.<br>• C1937<br>— The difference between the steering angle calculated by each sensor and the steering angle from the steering angle sensor exceeds specification.<br>• C1938<br>— The difference between the steering angle previously received and the steering angle received at this time is not within specification.<br>— The signal from the steering angle sensor remains unchanged when the steering angle is turned to the right and left. |
| POSSIBLE CAUSE | • Improper installation or positioning of the steering angle sensor<br>• Steering angle sensor malfunction<br>• Poor connection at connectors (female terminal) |




DSC HU/CM WIRING HARNESS-SIDE CONNECTOR



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FOR BCM MALFUNCTION**<br>• Turn the ignition switch off.<br>• Using the M-MDS, perform the DTC inspection for the BCM.<br>• Are any DTCs detected? | Yes | Go to applicable DTC inspection.<br>(See 09-02F-2 DTC TABLE[BCM].) |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Are the same DTCs present? | Yes | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 3 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

**DTC C1306**

id040200802000

**Note**

- The steering angle initialization value of the BCM is stored using the battery power supply. Therefore, the battery power supply of the BCM is cut and the stored steering angle initialization value is cleared when any of the following items are performed. DTC C1306 is stored in the memory.
  - — Negative battery cable disconnection
  - — BCM connector disconnection
  - — Fuse (ROOM) removal
  - — Wiring harness disconnection between battery and steering angle sensor connector
  - — Wiring harness disconnection between battery, BCM connector, steering angle sensor connector

| DTC C1306 | Steering angle sensor (abnormal initialization) system |
|---|---|
| DETECTION CONDITION | • The steering angle sensor detects that the initialization procedure has not been performed. |
| POSSIBLE CAUSE | • The initialization procedure for the steering angle sensor has not been performed.<br>• Steering angle sensor malfunction<br>• BCM malfunction<br>• The negative battery cable connector was disconnected previously.<br>• The steering angle sensor connector was disconnected previously.<br>• The BCM connector was disconnected previously.<br>• The fuse (ROOM) was removed previously. |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY INITIALIZATION PROCEDURE.**<br>• Has the steering angle sensor initialization procedure been performed? | Yes | Go to the next step. |
| | | No | Perform the steering angle sensor initialization procedure, then go to Step 3. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.) |
| 2 | **INSPECT FOR BCM MALFUNCTION**<br>• Turn the ignition switch off.<br>• Using the M-MDS, perform the DTC inspection for the BCM.<br>• Are any DTCs detected? | Yes | Go to applicable DTC inspection. (See 09-02F-2 DTC TABLE[BCM].) |
| | | No | Go to the next step. |
| 3 | **VERIFY DTC TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory. (See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Is the same DTC present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction occurs again, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection. (See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

### DTC C1414

id040200805200

| DTC C1414 | Incorrect DSC HU/CM installed |
|---|---|
| DETECTION CONDITION | • Detection of situation where vehicle-type or drive system input signal and DSC HU/CM information remains incongruent through CAN information |
| POSSIBLE CAUSE | • Mismatched installation of DSC HU/CM |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY THAT THE CORRECT DSC HU/CM IS INSTALLED**<br>• Verify the part number of the DSC HU/CM.<br>• Is the part number correct? | Yes | Go to the next step. |
| | | No | After replacing the DSC HU/CM, go to Step 3.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| 2 | **CONFIGURE DSC HU/CM**<br>• Can DSC HU/CM configure properly? | Yes | Go to the next step. |
| | | No | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| 3 | **VERIFY DTC TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Is the same DTC present? | Yes | Repeat the inspection from Step 1.<br>If the malfunction recurs, replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

### DTC C1994

id040200802200

| DTC C1994 | DSC control system |
|---|---|
| DETECTION CONDITION | • DSC control for the front wheels continues for **10 s or more.**<br>• During DSC control, the pressure increase operation to any of the all four wheels does not occur for **1.3 s or more**. |
| POSSIBLE CAUSE | • This does not indicate a malfunction since constant control over extended period of time is inhibited to protect the DSC solenoid valve inside the DSC HU. |

**Diagnostic procedure**

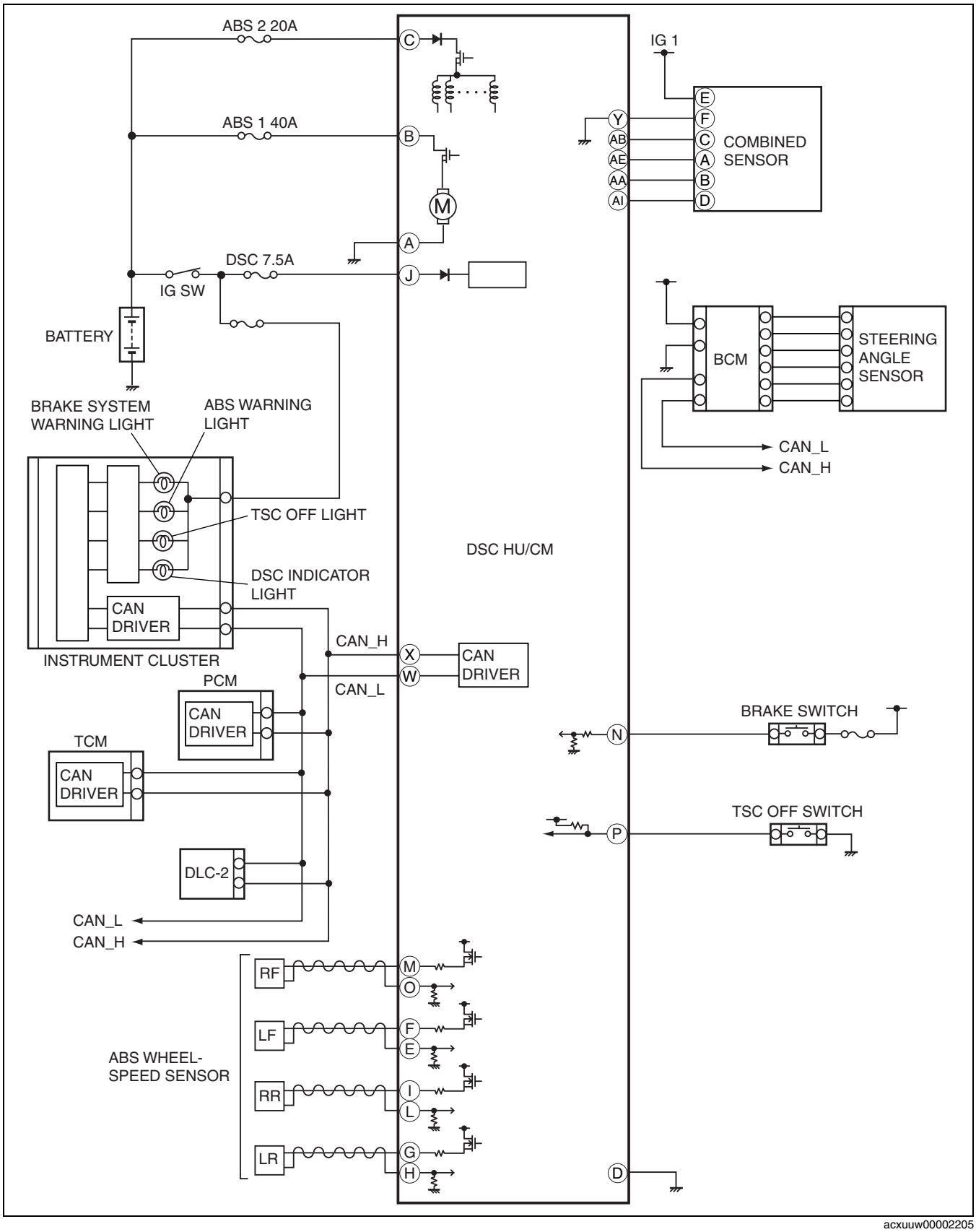
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the memory.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• Are the same DTCs present? | Yes | Replace the DSC HU/CM, then go to the next step.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Are any other DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | DTC troubleshooting completed. |

# 04-03 SYMPTOM TROUBLESHOOTING

SYSTEM WIRING DIAGRAM . . . . . 04-03–2
FOREWORD . . . . . 04-03–3
PRECAUTION . . . . . 04-03–3
Intermittent Concern Troubleshooting . . . . . 04-03–4
SYMPTOM TROUBLESHOOTING . . . . . 04-03–6
NO.1 ANY OF THE FOLLOWING LIGHTS DO NOT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR TCS OFF LIGHT) . . . . . 04-03–8
NO.2 ANY OF THE FOLLOWING LIGHTS REMAIN ON: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR TCS OFF LIGHT) . . . . . 04-03–9
NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND TCS OFF LIGHT DO NOT ILLUMINATE. . . . . 04-03–10
NO.4 ABS OR TCS*1 OPERATES FREQUENTLY/TCS DOES NOT WORK CORRECTLY*1: DSC SYSTEM FUNCTION CONTAINS TRACTION CONTROL FUNCTION, DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING . . . . . 04-03–10
NO.5 DSC*2 OPERATES FREQUENTLY/DSC DOES NOT WORK CORRECTLY*2: DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING . . . . . 04-03–11

## SYSTEM WIRING DIAGRAM

id040300800100

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## FOREWORD

id040300800200

- Before performing the steps in Symptom Troubleshooting, perform the On-board Diagnostic Inspection. To check the DTC, follow the DTC Inspection steps. (See 04-02-3 ON-BOARD DIAGNOSIS.)

## PRECAUTION

id040300800300

1. The ABS warning light and/or BRAKE system warning light and/or DSC indicator light and/or TCS OFF light illuminate even when the system is normal.

| Warning lights that may illuminate and/or flash | Condition under which the light may illuminate | Conditions under which the light will go out | ABS, EBD, TCS and DSC control |
|---|---|---|---|
| • ABS warning light<br>• BRAKE system warning light<br>• DSC indicator light | Under any of the following conditions:<br>• When the front wheels are jacked up, stuck, or placed on a chassis roller, and only the front wheel ABS wheel speed sensors are spun for **20 s or more**. | After turning ignition switch off, vehicle is driven at speed **greater than 10 km/h {6.2 mph}** and normal operation is confirmed. | • ABS: Disables control.<br>• EBD:<br>1. Disable control, in cases where the light may illuminate, only when ABS HU/CM detects that wheel speed sensors determine that two or more wheels are malfunctioning.<br>2. Enables control, if wheel speed sensors determine three or more wheels are functioning correctly.<br>• TCS: Disables control.<br>• DSC: Disables control. |
| | Parking brake is not fully released while driving. | | |
| | Brake drag. | | |
| | Sudden acceleration/deceleration. | | |
| | Left/right or front/rear tires are different. (Size, radius, tire pressure, or wear is other than that listed on tire label.) | | |
| | Battery voltage at DSC HU/CM ignition terminal drops **below approx. 10 V**. | Battery voltage rises **above approx. 10 V**. | ABS: Disables control.<br>EBD: Enables control.<br>TCS: Disables control.<br>DSC: Disables control. |
| • Brake system warning light | Brake fluid amount is low. | Brake fluid level lower than recommended amount. | ABS: Enables control.<br>EBD: Enables control.<br>TCS: Enables control.<br>DSC: Enables control. |

2. Precautions during servicing of DSC
   The DSC is composed of electrical and mechanical parts. It is necessary to categorize malfunctions as being either electrical or hydraulic when performing troubleshooting.
   (1) Malfunction in electrical system
   - The control module has an on-board diagnostic function. With this function, the ABS warning light and/or BRAKE system warning light and/or DSC indicator light and/or TCS OFF light will illuminate when there is a problem in the electrical system.
     Also, past and present malfunctions are in the control module. This function can find malfunctions that do not occur during periodic inspections. Connect the M-MDS to the DLC-2, the stored malfunctions will be displayed in the order of occurrence. To find out the causes of DSC malfunctions, use these on-board diagnostic results.
   - If a malfunction occurred in the past but is now normal, the cause is likely a temporary poor connection of the wiring harness.
     The control module usually operates normally. Be careful when searching for the cause of malfunction.
   - After repair, it is necessary to clear the DTC from the control module memory.
     Also, if the DSC related parts have been replaced, verify that no DTC is displayed after repairs.
   - After repairing the ABS wheel-speed sensor or ABS sensor rotor, or after replacing the control module, the ABS warning light may not go out even when the ignition switch is turned to the ON position. In this case, drive the vehicle at a speed of **more than 10 km/h {6.2 mph}**, make sure the ABS warning light goes out, and then clear the DTC.
   - When repairing, if the DSC related connectors are disconnected and the ignition switch is turned to the ON position, the control module will mistakenly detect a fault and record it as a malfunction.

**Caution**

- **In DSC vehicles, when the DSC HU/CM, steering angle sensor, or combined sensor is replaced, perform the initialization procedure for each sensor. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.) (See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.)**

- To protect the control module, make sure the ignition is off before connecting or disconnecting the control module connector.

(2) Malfunctions in hydraulic system
- Symptoms in a hydraulic system malfunction are similar to those in a conventional brake malfunction. However, it is necessary to determine if the malfunction is in a DSC component or the conventional brake system.
- The hydraulic unit contains delicate mechanical parts. If foreign material gets into the component, the DSC may fail to operate. Also, it will likely become extremely difficult to find the location of the malfunction in the event that the brakes operate but the DSC does not. Make sure foreign material does not enter when servicing the DSC (e.g.brake fluid replacement, pipe removal).

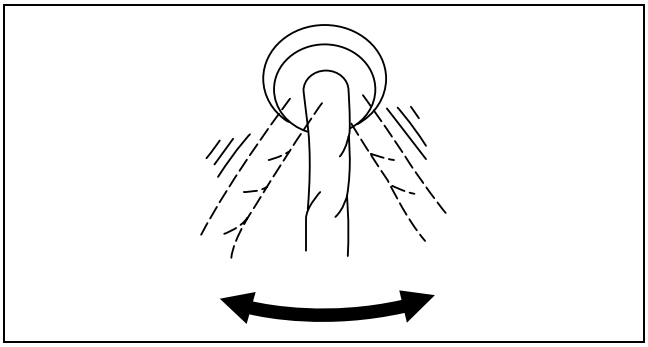
**Intermittent Concern Troubleshooting**
**Vibration method**
- If a malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform the following steps.

**Note**
- There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Inspect the following:
  — Connectors not fully seated.
  — Wire harnesses not having full play.
  — Wires laying across brackets or moving parts.
  — Wires routed too close to hot parts.
- An improperly routed, improperly clamped, or loose harness can cause wiring to become pinched between parts.
- The connector joints, points of vibration, and places where wiring harnesses pass through the firewall, body and other panels are the major areas to be inspected.

**Inspection method for switch connectors or wires**
1. Connect the M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

**Note**
- If the engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.
4. Turn the switch on manually.
5. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.



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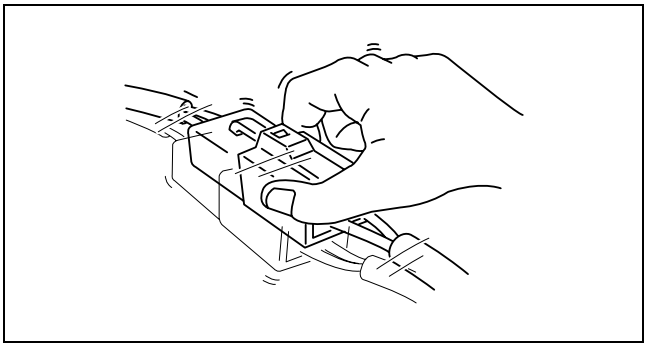
**Inspection method for sensor connectors or wires**
1. Connect the M-MDS to the DLC-2.
2. Turn the ignition switch to the ON position (engine off).

**Note**
- If the engine starts and runs, perform the following steps at idle.

3. Access PIDs for the switch you are inspecting.

4. Slightly shake each connector or wiring harness vertically and horizontally while monitoring the PID.
   - If the PID value is unstable, inspect for poor connection.



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**Inspection method for sensors**

1. Connect the M-MDS to DLC-2.
2. Turn the ignition switch to the ON position (engine off).

**Note**
- If engine starts and runs, perform the following steps at idle.

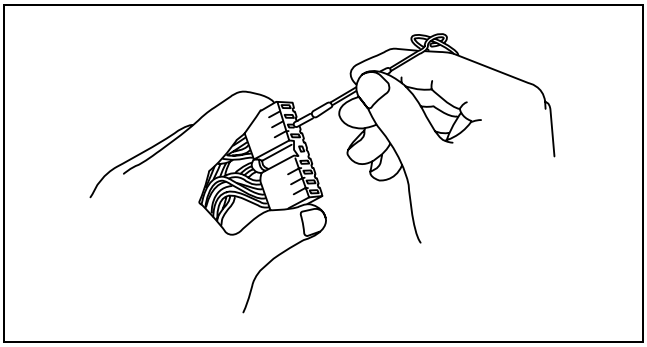
3. Access PIDs for the switch you are inspecting.
4. Vibrate the sensor slightly with your finger.
   - If the PID value is unstable or a malfunction occurs, inspect for poor connection and/or poorly mounted sensor.

**Malfunction data monitor method**

1. Perform the malfunction reappearance test according to malfunction reappearance mode and malfunction data monitor. The malfunction cause is found in the malfunction data.

**Inspection method for connector terminal**

1. Inspect the connection condition of each female terminal.
2. Insert the male terminal, and fit the female terminal side to female terminal. Inspect if the malfunction is in the female terminal.



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## SYMPTOM TROUBLESHOOTING

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- Verify the symptoms, and perform troubleshooting according to the appropriate number.

| No. | Symptom |
|---|---|
| 1 | Any of the following lights do not illuminate when the ignition switch is turned to the ON position.<br>• ABS warning light<br>• BRAKE system warning light<br>• DSC indicator light<br>• TCS OFF light |
| 2 | Any of the following lights remain on:<br>• ABS warning light.<br>• BRAKE system warning light<br>• DSC indicator light<br>• TCS OFF light |
| 3 | There is a malfunction in the system even though ABS warning light, BRAKE system warning light, DSC indicator light and TCS OFF light do not illuminate. |
| 4 | ABS or TCS*1 operates frequently. |
| | TCS does not work correctly. |
| 5 | DSC*2 operates frequently. |
| | DSC does not work correctly. |

*1 : DSC system contains traction control function; DSC indicator light illuminates and goes out while DSC is operating.

*2 : DSC indicator light illuminates and goes out while DSC is operating.

x: Applicable

| Troubleshooting item | | Possible factor: DSC HU/CM | Instrument cluster | CAN communication | Each sensor installation | Battery | Charging system | Brake fluid | Parking brake | Tire | Tire air pressure | Control module power supply system | Control module ground system | Instrument cluster power supply system | Instrument cluster ground system | Conventional brake |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Any of the following lights do not illuminate when the ignition switch is turned to the on position: (ABS warning light, BRAKE system warning light, DSC indicator light and/or TCS OFF light). | X | X | X | | | | | | | | | | X | X | |
| 2 | Any of the following lights remain on: (ABS warning light, BRAKE system warning light, DSC indicator light and/or TCS OFF light). | | X | X | | X | X | X | X | | | X | X | | | |
| 3 | There is a malfunction in the system even though ABS warning light, DSC indicator light, and TCS OFF light do not illuminate. | | | | | | | | | | | | | | | X |
| 4 | ABS or TCS (*1) operates frequently. /TCS does not work correctly.<br>(*1): DSC system contains traction control function; DSC indicator light goes on and off while DSC is operating. | | | | X | | | | | X | X | | | | | |
| 5 | DSC (*2) operates frequently. /DSC does not work correctly.<br>(*2): DSC indicator light goes on and while DSC is operating. | | | | X | | | | | X | X | | | | | |

*1: DSC system contains traction control function; DSC indicator light illuminates and goes out while DSC is operating.
*2: DSC indicator light illuminates and goes out while DSC is operating.

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## NO.1 ANY OF THE FOLLOWING LIGHTS DO NOT ILLUMINATE WHEN IGNITION SWITCH TURNED TO ON POSITION: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR TCS OFF LIGHT)

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| | |
|---|---|
| **1** | **Any of the following lights do not illuminate when the ignition switch is turned to the ON position: (ABS warning light, BRAKE system warning light, DSC indicator light and/or TCS OFF light).** |
| **[TROUBLESHOOTING HINTS]**<br>• **Inspect each light in the instrument cluster for malfunction**<br>• **Poor connection at DSC HU/CM connector** | |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FOR DTCS IN DSC HU/CM**<br>• Inspect the DTC for the DSC ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs been stored in memory? | Yes | Perform the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 2 | **INSPECT WHETHER MALFUNCTION IS IN INSTRUMENT CLUSTER SYSTEM OR OTHER SYSTEM**<br>• Do other warning and indicator lights illuminate when the ignition switch is turned to the ON position? | Yes | Go to the next step. |
| | | No | Inspect or repair the instrument cluster (power supply system, ground system). |
| 3 | **VERIFY THAT DSC HU/CM CONNECTOR IS CONNECTED**<br>• Is the DSC HU/CM securely connected? | Yes | Go to the next step. |
| | | No | Connect the DSC HU/CM connector securely, then go to the next step. |
| 4 | **VERIFY THAT DSC HU/CM CONNECTOR TERMINAL OR RELATED CONNECTOR TERMINALS ARE CONNECTED**<br>• Are DSC HU/CM connector terminal, instrument cluster connector terminal, or related connector terminals securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the DSC HU/CM connector terminal and related connector terminals. |
| 5 | **INSPECT INSTRUMENT CLUSTER**<br>• Inspect the instrument cluster.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>• If the instrument cluster normal | Yes | Replace the DCS HU/CM.<br>(see 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Replace the instrument cluster.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |

## NO.2 ANY OF THE FOLLOWING LIGHTS REMAIN ON: (ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND/OR TCS OFF LIGHT)

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| 2 | Any of the following lights remain on: (ABS warning light, BRAKE system warning light, DSC indicator light and/or TCS OFF light) |
|---|---|

**[TROUBLESHOOTING HINTS]**

- **Brake fluid amount is low**
- **Parking brake does not release**
- **No connection at DSC HU/CM connector**
  **(When DSC HU/CM connector is disconnected, ABS warning light and BRAKE system warning light illuminate)**
- **DSC HU/CM detected malfunction (Input and output device malfunction)**
- **DSC HU/CM detects low voltage in power supply**
- **DSC HU/CM ground malfunction**
  **(When DSC HU/CM ground is not securely connected, ABS warning light and BRAKE system warning light illuminate but diagnostic trouble code does not displayed)**
- **DSC HU/CM does not operate (DSC HU/CM malfunction)**



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT BRAKE FLUID AMOUNT AND VERIFY THAT PARKING BRAKE RELEASES**<br>• Is the brake fluid amount normal?<br>• Is the parking brake lever released? | Yes | Go to the next step. |
| | | No | Add brake fluid or release parking brake lever. |
| 2 | **INSPECT DTCS IN INSTRUMENT CLUSTER**<br>• Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Has DTC U2064 been recorded in memory? | Yes | Go to the next step. |
| | | No | Inspect the instrument cluster.<br>(See 09-22-3 INSTRUMENT CLUSTER INSPECTION.) |
| 3 | **INSPECT DTCS IN DSC HU/CM**<br>• Inspect the DTC for the DSC ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs been stored in memory? | Yes | Perform inspection using appropriate DTC.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 4 | **INSPECT WHETHER MALFUNCTION IS IN CONTROL MODULE CONNECTOR, TERMINAL OR OTHER**<br>• Do the ABS warning light and BRAKE system warning light go out after **4 s** when the ignition switch is turned to the ON position? | Yes | Temporary poor connection in control module connector.<br>Inspect DSC HU/CM connector, then go to Step 7.<br>Inspect DSC HU/CM connector terminal, then go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT BATTERY**<br>• Is the battery voltage normal? | Yes | Go to the next step. |
| | | No | Inspect the battery and charging system.<br>(See 01-17-2 BATTERY INSPECTION[L3 WITH TC].)<br>(See 01-17-6 GENERATOR INSPECTION[L3 WITH TC].) |
| 6 | **INSPECT CHARGING SYSTEM**<br>• Is the battery voltage normal with electrical load (A/C, headlight, etc.) on and engine idling? | Yes | Go to the next step. |
| | | No | Inspect the charging system (drive belt tension, generator, etc.).<br>(See 01-17-6 GENERATOR INSPECTION[L3 WITH TC].) |
| 7 | **VERIFY THAT DSC HU/CM CONNECTOR IS CONNECTED**<br>• Is the DSC HU/CM securely connected? | Yes | Go to the next step. |
| | | No | Connect the DSC HU/CM connector securely, then go to the next step. |
| 8 | **VERIFY THAT DSC HU/CM CONNECTOR TERMINAL OR RELATED CONNECTOR TERMINALS ARE CONNECTED**<br>• Are the DSC HU/CM connector terminal or instrument cluster connector terminal etc. related connector terminals securely connected? | Yes | Replace the DSC HU/CM.<br>(See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.) |
| | | No | Securely connect the DSC HU/CM connector terminal and related connector terminals. |

### NO.3 THERE IS A MALFUNCTION IN THE SYSTEM EVEN THOUGH ABS WARNING LIGHT, BRAKE SYSTEM WARNING LIGHT, DSC INDICATOR LIGHT AND TCS OFF LIGHT DO NOT ILLUMINATE

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| | |
|---|---|
| **3** | **There is a malfunction in the system even though the ABS warning light, BRAKE system warning light, DSC indicator light and TCS OFF light do not illuminate.** |
| **[TROUBLESHOOTING HINTS]**<br>• **There is a mechanical malfunction in system** | |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DSC HU/CM FOR DTCs**<br>• Inspect the DTC for the DSC ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs been stored in memory? | Yes | Perform the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DSC SYSTEM**<br>• Perform DSC system inspection.<br>(See 04-15-4 DSC SYSTEM INSPECTION.)<br>• Is the system normal? | Yes | Inspect the conventional brake system. |
| | | No | Repair or replace any malfunctioning part. |

### NO.4 ABS OR TCS*1 OPERATES FREQUENTLY/TCS DOES NOT WORK CORRECTLY*1: DSC SYSTEM FUNCTION CONTAINS TRACTION CONTROL FUNCTION, DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING

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| | |
|---|---|
| **4** | **ABS or TCS (*1) operates frequently./TCS does not work correctly.**<br>**(*1): DSC system function contains traction control function; DSC indicator light goes on and off while DSC is operating.** |
| **[TROUBLESHOOTING HINTS]**<br>• **There is a difference in size or air pressure between the front and rear tires**<br>• **Incorrect ABS wheel-speed signal is input to DSC HU/CM**<br>• **There is a malfunction in the engine control system (TCS malfunction)**<br>• **Tire problem (low or high air pressure, excessive wear, different grip level by four wheels)** | |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DTCS IN DSC HU/CM**<br>• Inspect the DTC for the DSC ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs been stored in memory? | Yes | Perform the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 2 | **INSPECT TIRE SIZE AND AIR PRESSURE**<br>• Inspect the tire size and the air pressure.<br>• Are size and air pressure as specified? | Yes | Go to the next step. |
| | | No | Replace with specified tires and adjust tire air pressure. |
| 3 | **INSPECT ABS WHEEL-SPEED SENSOR OUTPUT VALUE**<br>• Inspect the output value from the ABS wheel-speed sensor.<br>(See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].)<br>• Is the output value normal? | Yes | Go to the next step. |
| | | No | • ABS wheel-speed sensor installation inspection:<br>Inspect the sensor for looseness and verify that it is securely installed.<br>• Sensor rotor installation inspection:<br>Inspect the sensor rotor for poor installation and chipping of sensor rotor teeth. (If sensor rotor is installed poorly, it may cause output of abnormal wave form at high speed.) |
| 4 | **VERIFY THAT TIRE CONDITION**<br>• Verify tire condition for following:<br>— Wear<br>— Grip level (different by four wheels)<br>• Are tires condition okay? | Yes | Find malfunctioning part according to "INTERMITTENT CONCERN TROUBLESHOOTING". |
| | | No | Adjust, repair or replace tire. |

## NO.5 DSC*2 OPERATES FREQUENTLY/DSC DOES NOT WORK CORRECTLY*2: DSC INDICATOR LIGHT GOES ON AND OFF WHILE DSC IS OPERATING

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| | |
|---|---|
| **5** | **DSC (*2) operates frequently. /DSC does not work correctly.<br>(*2): DSC indicator light goes on and off while DSC is operating.** |

**[TROUBLESHOOTING HINTS]**
- **DSC HU/CM detected malfunction (input and output device malfunction)**
- **Poor installation of yaw rate sensor, lateral-G sensor and/or steering angle sensor (If any of the above sensors are poorly installed, DSC may operate intermittently)**
- **When replacing the DSC HU/CM, combined sensor or steering angle sensor, initialization is not performed. (If initialization is not performed correctly, DSC may not work correctly)**

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DSC HU/CM FOR DTCs**<br>• Inspect the DTC for the DSC ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs been recorded in memory? | Yes | Perform the applicable DTC inspection.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 2 | **VERIFY THAT EACH SENSOR IS INSTALLED**<br>• Are the combined sensor and steering angle sensor securely installed? | Yes | Go to the next step. |
| | | No | Install sensor securely. |
| *3 | **VERIFY THAT EACH SENSOR IS INITIALIZED**<br>• Was initialization performed after replacement of the DSC HU/CM, combined sensor or steering angle sensor? | Yes | Go to the next step. |
| | | No | Perform initialization procedure.<br>(See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.)<br>(See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.) |
| 4 | **VERIFY THAT TIRE CONDITION**<br>• Verify tire condition for following:<br>— Air pressure<br>— Wear<br>— Grip level (different by four wheels)<br>• Are tires condition okay? | Yes | Find malfunctioning part according to "INTERMITTENT CONCERN TROUBLESHOOTING". |
| | | No | Adjust, repair or replace tire. |

# 04-10 GENERAL PROCEDURES

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Steering Angle Sensor Initialization Procedure . . . . . **04-10–2**

## GENERAL PROCEDURES (BRAKE)

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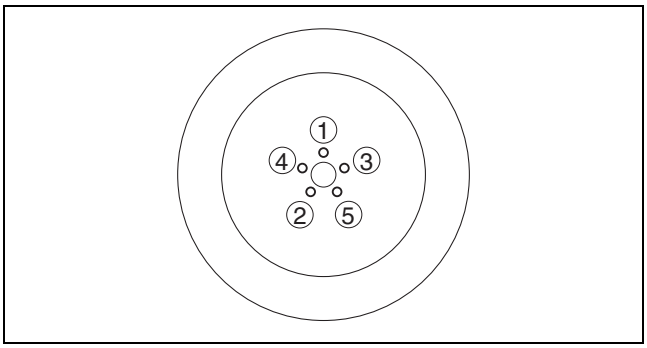
### Wheel and Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   **Tightening torque**
   **88.2— 117.6 N·m {9.00— 11.99 Kgf·m, 65.06— 86.73 ft·lbf}**

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### Brake Lines Disconnection

1. If any brake line has been disconnected during the procedures, add brake fluid, bleed the brakes, and inspect for leakage after the procedure has been completed.

   **Caution**
   - **Brake fluid will damage painted surfaces. Be careful not to spill any on painted surfaces. If it is spilled, wipe it off immediately.**

### Brake Pipe Flare Nut Tightening

1. Tighten the brake pipe flare nut using the **SST** (49 0259 770B) or any commercially available flare nut wrench.

### Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)

### DSC Related Parts

1. Make sure that there are no DTCs in the DSC memory after working on DSC related parts. If there are any DTCs in the memory, clear them. (See 04-02-3 ON-BOARD DIAGNOSIS.)

### DSC Related Part Sensor Initialization Procedure

**Warning**
- **If the initialization procedure is not completed, the DSC will not operate properly and it might cause an unexpected accident. Therefore, when replacing or removing the following parts, make sure to perform the initialization procedure to insure proper DSC operation.**

1. When replacing or removing the following parts, perform the initialization procedure. (See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.)
   - DSC HU/CM
   - Combined sensor

**Steering Angle Sensor Initialization Procedure**

**Warning**

- **Unless the initialization procedure of the steering angle sensor is completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the power supply to the BCM has been cut off due to disconnection of the BCM connector or negative battery cable, or any other cause.**

**Caution**

- **The steering angle sensor initialization value of the BCM is stored using the battery power supply. Therefore, the battery power supply of the BCM is cut and the stored steering angle initialization value is cleared when any of the following items are performed.**
  - **— Negative battery cable disconnection**
  - **— BCM connector disconnection**
  - **— Steering angle sensor connector disconnection**
  - **— Fuse (ROOM) removal**
  - **— Wiring harness disconnection between battery, BCM connector, steering angle sensor connector**
- **If the initialization procedure for the steering angle sensor has not been performed, when the ignition switch is turned to the ON position, the DSC indicator light illuminates and the TCS OFF light flashes to warn of a malfunction.**

1. When replacing or removing the following parts, perform the initialization procedure. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)
   - Negative battery cable disconnection
   - BCM connector disconnection
   - Steering angle sensor connector disconnection
   - Fuse (ROOM) removal
   - Wiring harness disconnection between battery, BCM connector, steering angle sensor connector

# 04-11 CONVENTIONAL BRAKE SYSTEM

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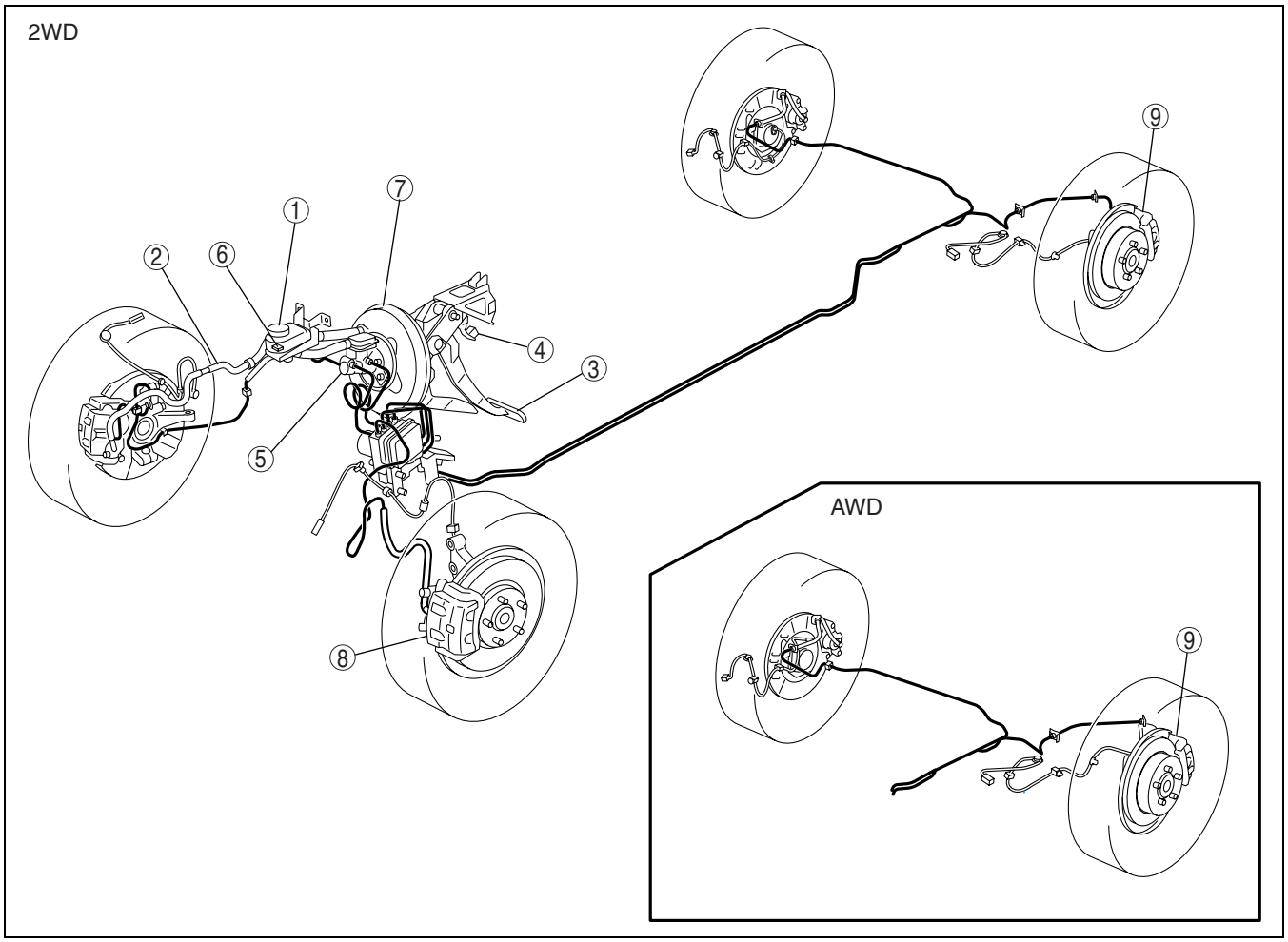


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| | |
|---|---|
| 1 | Brake fluid reserve tank<br>(See 04-11-3 AIR BLEEDING.) |
| 2 | Vacuum line<br>(See 04-11-3 VACUUM LINE INSPECTION.)<br>(See 04-11-4 VACUUM HOSE REMOVAL/ INSTALLATION.) |
| 3 | Brake pedal<br>(See 04-11-4 BRAKE PEDAL INSPECTION.)<br>(See 04-11-6 BRAKE PEDAL REMOVAL/ INSTALLATION.) |
| 4 | Brake switch<br>(See 04-11-9 BRAKE SWITCH INSPECTION.) |
| 5 | Master cylinder<br>(See 04-11-10 MASTER CYLINDER REMOVAL/ INSTALLATION.) |
| 6 | Brake fluid level sensor<br>(See 04-11-11 BRAKE FLUID LEVEL SENSOR INSPECTION.) |

| | |
|---|---|
| 7 | Power brake unit<br>(See 04-11-11 POWER BRAKE UNIT INSPECTION.)<br>(See 04-11-13 POWER BRAKE UNIT REMOVAL/ INSTALLATION.) |
| 8 | Front brake (disc)<br>(See 04-11-14 FRONT BRAKE (DISC) INSPECTION.)<br>(See 04-11-17 FRONT BRAKE (DISC) REMOVAL/ INSTALLATION.)<br>(See 04-11-18 DISC PAD (FRONT) REPLACEMENT.)<br>(See 04-11-18 CALIPER (FRONT) DISASSEMBLY/ ASSEMBLY.) |
| 9 | Rear brake (disc)<br>(See 04-11-19 REAR BRAKE (DISC) INSPECTION.)<br>(See 04-11-22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION.)<br>(See 04-11-24 DISC PAD (REAR) REPLACEMENT.)<br>(See 04-11-25 CALIPER (REAR) DISASSEMBLY/ ASSEMBLY.) |

## AIR BLEEDING

id041100800200

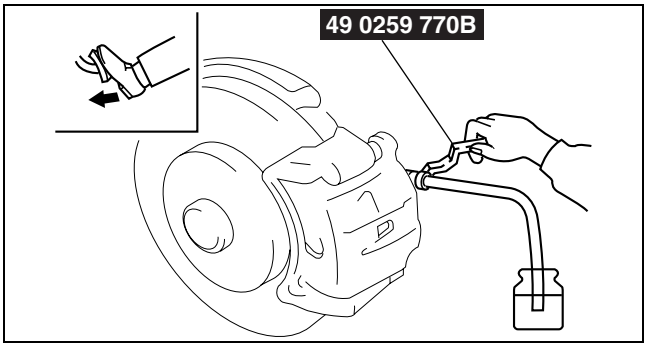
**Caution**
- **Brake fluid will damage painted surfaces. Be careful not to spill any on painted surfaces. If it is spilled, wipe it off immediately.**

**Note**
- Keep the fluid level in the reserve tank at 3/4 full or more during the air bleeding.
- Begin air bleeding with the brake caliper that is furthest from the master cylinder.

**Brake fluid type**
**SAE J1703, FMVSS 116 DOT-3**

1. Remove the bleeder cap on the brake caliper, and attach a vinyl tube to the bleeder screw.
2. Place the other end of the vinyl tube in a clear container and fill the container with fluid during air bleeding.
3. Working with two people, one should pump the brake pedal several times and depress and hold the pedal down.
4. While the brake pedal is depressed, the other should loosen the bleeder screw using the **SST**, drain out any fluid containing air bubbles, and tighten the bleeder screw.

   **Tightening torque**
   **Front: 5.9— 9.8 N·m {61— 99 kgf·cm, 53— 86 in·lbf}**
   **Rear: 6.9— 9.8 N·m {71— 99 kgf·cm, 61— 86 in·lbf}**



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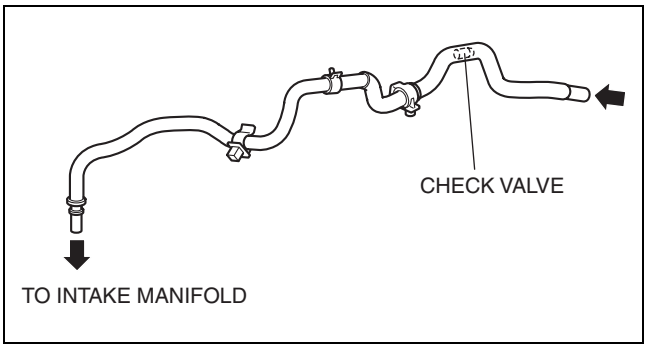
5. Repeat Steps 3 and 4 until no air bubbles are seen.
6. Perform air bleeding as described in the above procedures for all brake calipers.
7. After air bleeding, inspect the following:
   - Brake operation
   - Fluid leakage
   - Fluid level

## VACUUM LINE INSPECTION

id041100801500

1. Remove the vacuum hose. (See 04-11-4 VACUUM HOSE REMOVAL/INSTALLATION.)
2. Verify that air can be blown from the power brake unit side of the vacuum hose towards the engine side, and that air cannot be blown in the opposite direction.
   - If there is any malfunction of the inner check valve, replace it together with the vacuum hose as a single unit.



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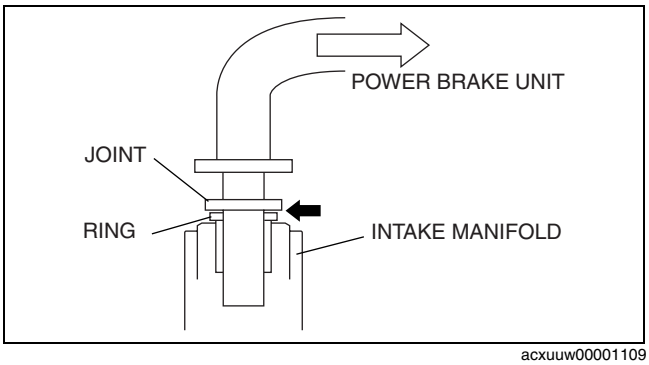
### VACUUM HOSE REMOVAL/INSTALLATION

id041100801600

1. Remove the clamps and vacuum hose (power brake unit side).
2. Insert a thin flathead screwdriver at the point indicated by the arrow in the figure, push the ring down and disconnect the vacuum hose from the intake manifold.
3. Remove the vacuum hose.
4. Install in the reverse order of removal.

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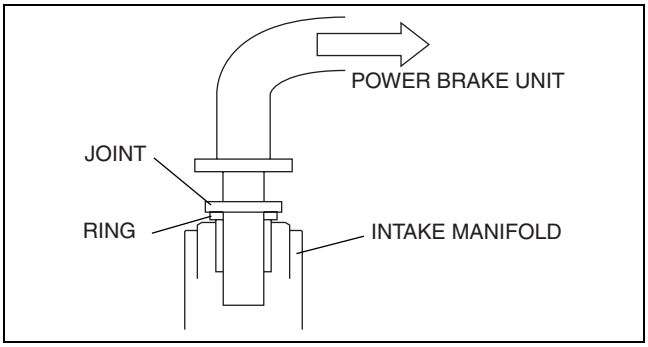
5. Verify that the vacuum hose is inserted so that the joint contacts the intake manifold ring.

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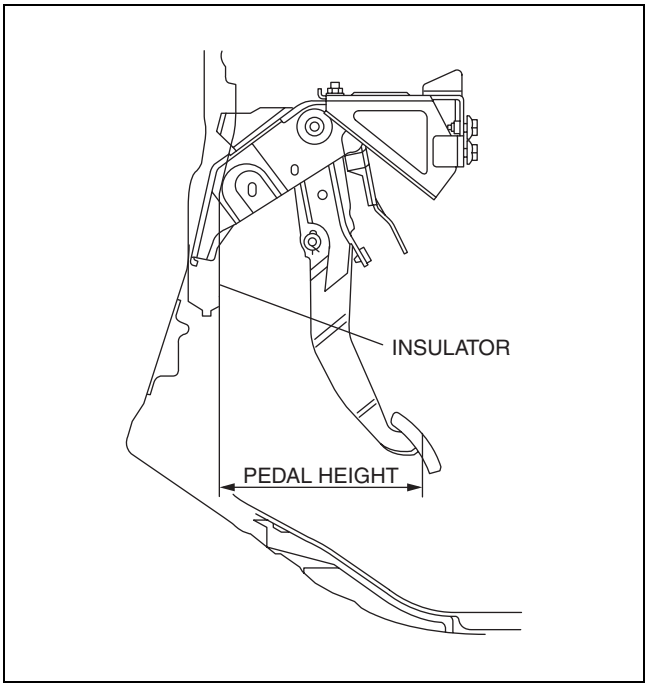
### BRAKE PEDAL INSPECTION

id041100801100

#### Pedal Height Inspection

1. Measure the distance from the center of the upper surface of the pedal pad to the insulator and verify that it is as specified.
   - If not within the specification, inspect the following items and repair or replace the applicable part if there is any malfunction.
     — Power brake unit installation condition
     — Deformation of or damage to the power brake unit fork
     — Brake pedal installation condition
     — Clevis pin wear
   - If there is no malfunction in the above items, replace the brake pedal.

   **Brake pedal height (reference value)**
   **204.3 mm {8.043 in}**

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**Pedal Play Inspection**

1. Pump the pedal several times to release the vacuum in the power brake unit.
2. Gently depress the pedal by hand and measure the pedal play.
   - If not within the specification, inspect the wear of the clevis pin. Replace it if there is any malfunction.

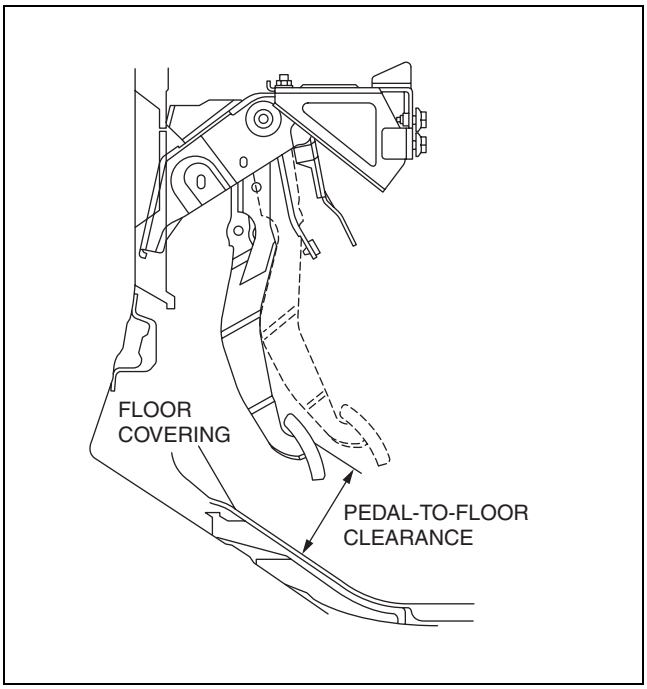
**Brake pedal play**
**2— 5 mm {0.08— 0.19 in}**

**Note**
- If there is no malfunction in the clevis pin, there is a possibility that the power brake unit has some malfunction. Verify that there are no malfunctions, and replace it if necessary.

**Pedal-to-floor Clearance Inspection**

1. Start the engine and depress the brake pedal with a force of **147 N {15.0 kgf, 33.0 lbf}**.
2. Measure the distance from the center of the upper surface of the pedal pad to the floor covering and verify that it is as specified.
   - If it is less than the specification, inspect for air in the brake line.

**Brake pedal-to-floor clearance (Brake pedal when depressed at 147 N {15.0 kgf, 33.0 lbf})**
**99.1 mm {3.91 in} or more**

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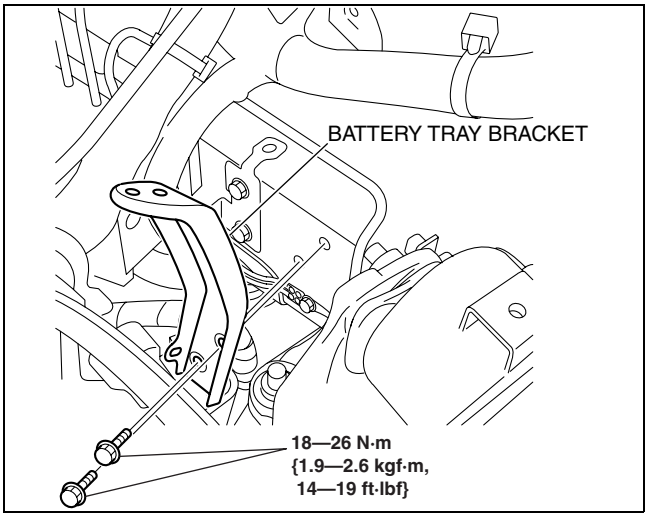
## BRAKE PEDAL REMOVAL/INSTALLATION

id041100801200

**Caution**

- **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch is inserted into the installation hole on the brake pedal and rotated to fix in place. If the brake switch is not properly installed, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake pedal is properly installed and fully released before installing the brake switch to the pedal.**
- **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the battery tray bracket as shown in the figure.
3. Disconnect the brake fluid level sensor connector.
4. Remove the master cylinder reserve tank bracket installation nuts. (See 04-11-10 MASTER CYLINDER REMOVAL/INSTALLATION.)
5. Remove the accelerator pedal. (See 01-13-17 ACCELERATOR PEDAL REMOVAL/ INSTALLATION[L3 WITH TC].)
6. Remove in the order indicated in the table.
7. Install in the reverse order of removal.

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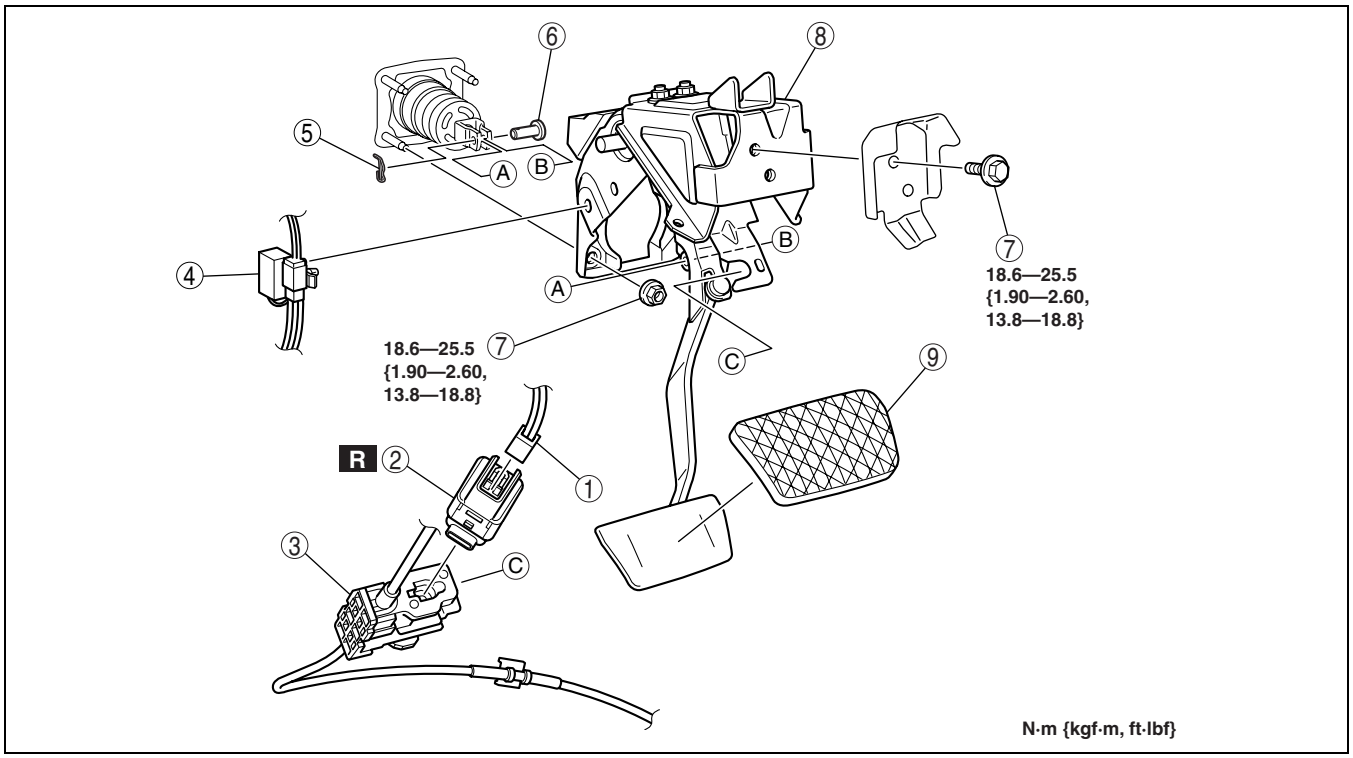


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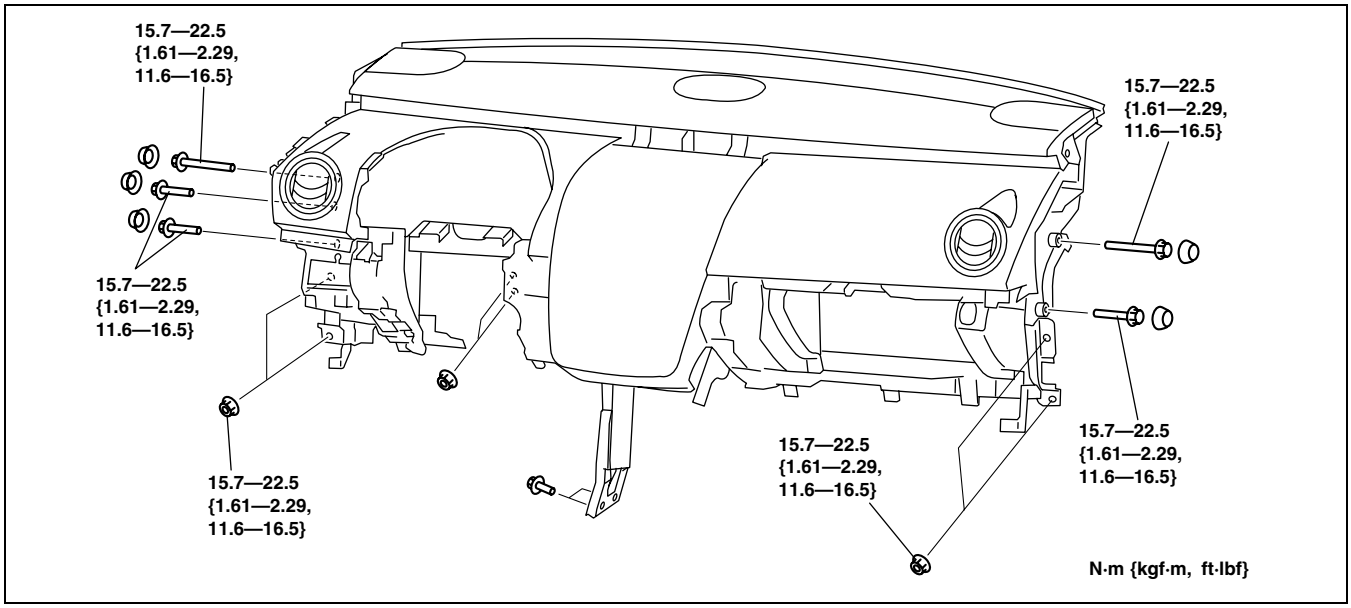
| | |
|---|---|
| 1 | Brake switch connector<br>(See 04-11-8 Brake Switch Connector Installation Note.) |
| 2 | Brake switch<br>(See 04-11-8 Brake Switch Installation Note.) |
| 3 | Interlock cable<br>(See 05-18-2 INTERLOCK CABLE ADJUSTMENT.) |
| 4 | Noise filter |
| 5 | Snap pin |
| 6 | Clevis pin |

| | |
|---|---|
| 7 | Bolt, nut |
| 8 | Brake pedal<br>(See 04-11-7 Brake Pedal Removal Note.) |
| 9 | Pedal pad |

**Brake Pedal Removal Note**

1. Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
2. Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
3. Remove the front scuff plate inner. (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
4. Remove the front side trim. (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
5. Remove the Glove Compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
6. Remove the lower panel. (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
7. Remove the hood release lever. (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
8. Remove the lower panel. (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
9. Remove the a-pillar lower trim. (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
10. Remove the a-pillar trim. (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
11. Remove the dashboard installation bolts and nuts as shown in the figure.

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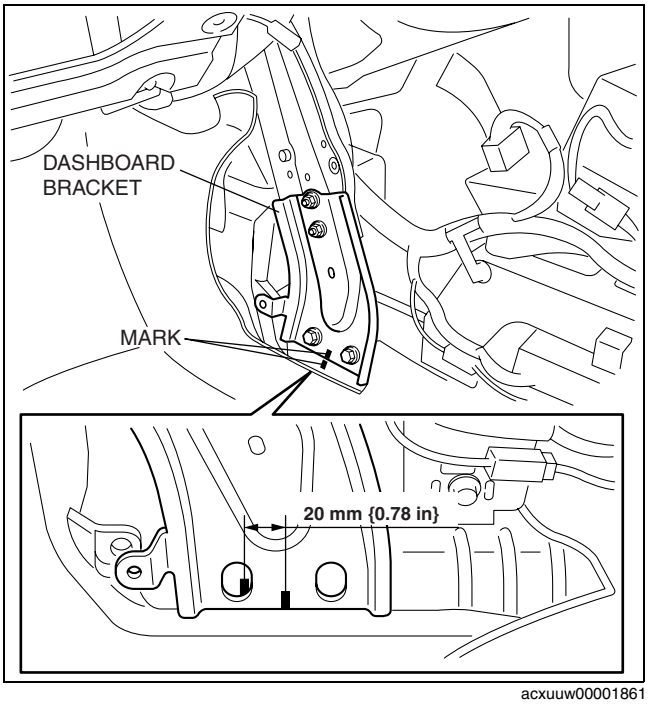
12. Lift up the upper side of the dashboard and move it **20 mm {0.78 in}** towards the vehicle rear.

    **Caution**
    - **If the dashboard is moved towards the vehicle rear excessively, the wiring harness could be damaged. Mark the position and verify the distance when moving the dashboard.**

13. Move the power brake unit to the vehicle front where the power brake unit fork does not interfere with the brake pedal arm.
14. Remove the brake pedal.



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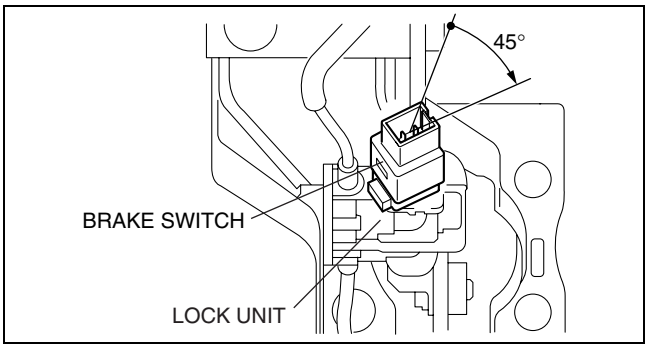
**Brake Switch Installation Note**

1. Inspect the brake pedal. (See 04-11-4 BRAKE PEDAL INSPECTION.)
2. With the brake pedal fully released, insert a new brake switch into the installation hole on the lock unit.
3. Secure the brake switch by turning it counterclockwise **45**°.



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**Brake Switch Connector Installation Note**

1. Inspect the brake pedal. (See 04-11-6 BRAKE PEDAL REMOVAL/INSTALLATION.)
2. With the brake pedal in its original position, install the brake switch to the brake switch connector.

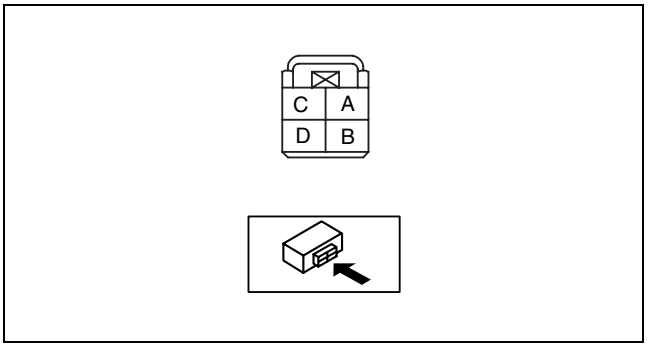
## BRAKE SWITCH INSPECTION

id041100801900

**Caution**

- **Inspect the brake switch with it installed to the brake pedal, otherwise the brake switch may not operate normally. If the brake switch is removed from the brake pedal, replace the brake switch with a new one.**

1. Disconnect the brake switch connector.
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the brake switch.

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○—○ : Continuity

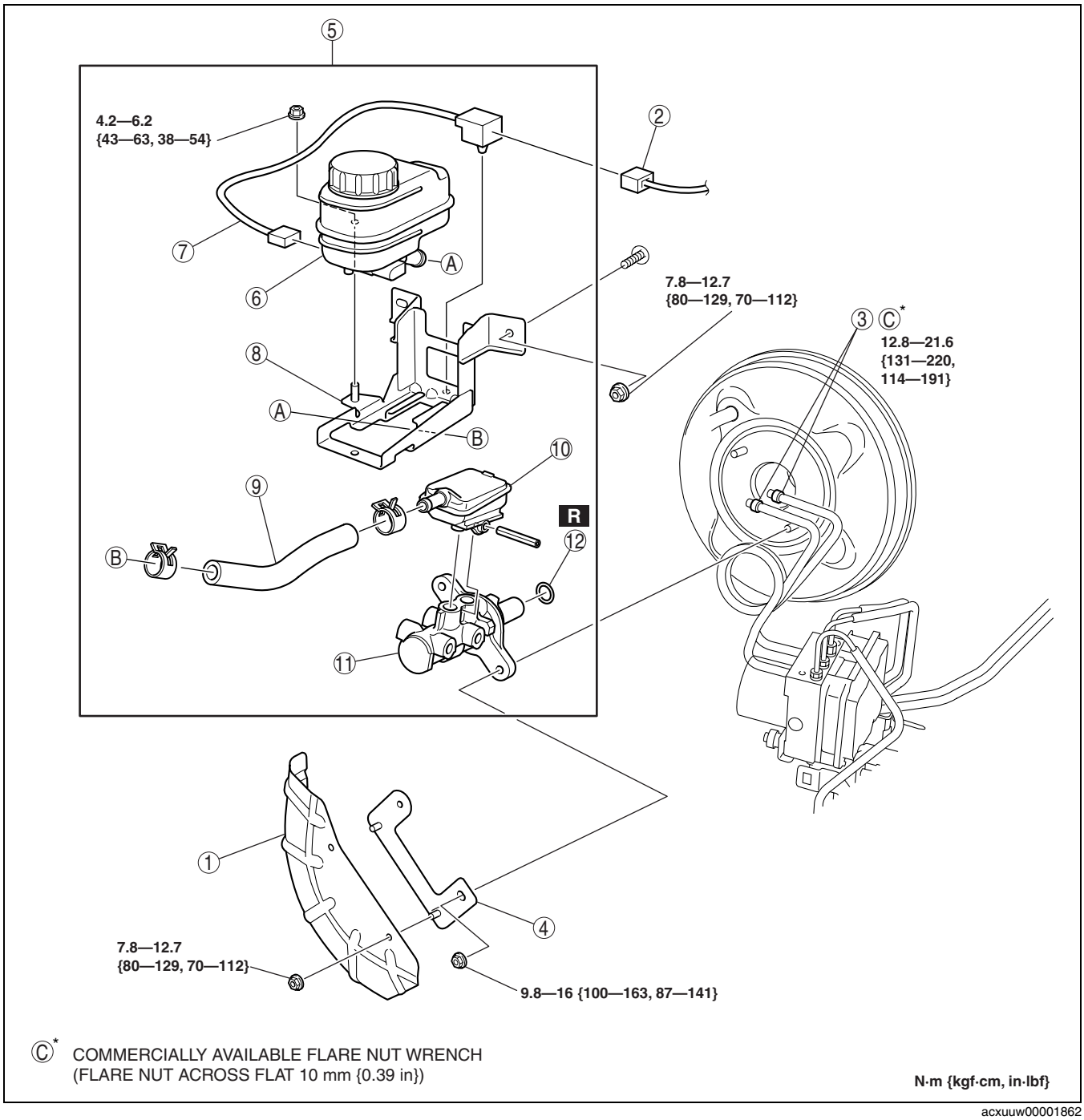
| Condition | Terminal | | | |
|---|---|---|---|---|
| | A | B | C | D |
| When the brake pedal is depressed | | ○ | | ○ |
| When the brake pedal is not depressed (With cruise control system) | ○ | | ○ | |

acxuuw00001093

## MASTER CYLINDER REMOVAL/INSTALLATION

id041100801300

1. Remove the battery. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)




Ⓒ* COMMERCIALLY AVAILABLE FLARE NUT WRENCH
(FLARE NUT ACROSS FLAT 10 mm {0.39 in})

**N·m {kgf·cm, in·lbf}**

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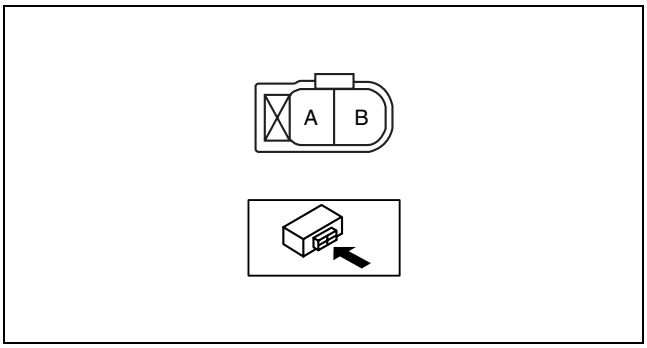
| | |
|---|---|
| 1 | Insulator |
| 2 | Brake fluid level sensor connector |
| 3 | Brake pipe |
| 4 | Insulator bracket |
| 5 | Master cylinder component |
| 6 | No.1 reserve tank |

| | |
|---|---|
| 7 | Brake fluid level sensor short cord |
| 8 | Reserve tank bracket |
| 9 | Reserve tank hose |
| 10 | No.2 reserve tank |
| 11 | Master cylinder |
| 12 | O-ring |

## BRAKE FLUID LEVEL SENSOR INSPECTION

id041100801400

1. Disconnect the brake fluid level sensor connector from the master cylinder.
2. Inspect for continuity according to fluid level between the brake fluid level sensor terminals.
   - If not as indicated in the table, replace the No.1 reserve tank. (See 04-11-10 MASTER CYLINDER REMOVAL/INSTALLATION.)

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○—○: Continuity

| Condition | Terminal | |
|---|---|---|
| | **A** | **B** |
| Above MIN | ○ | ○ |
| Below MIN | | |

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## POWER BRAKE UNIT INSPECTION

id041100801700

**Note**
- The following inspection methods are simple inspection methods to judge the function of the power brake unit.
- If there is any malfunction in the power brake unit, replace the power brake unit as a single unit.

**Without Using SST**

**Operation inspection**
1. With the engine stopped, pump the pedal a few times.
2. With the pedal depressed, start the engine.
3. If the pedal moves down slightly immediately after starting the engine, the unit is normal.

**Vacuum function inspection**
1. Start the engine.
2. Stop the engine after driving the vehicle for **1— 2 min**.
3. Depress the pedal with normal force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is normal.
   - If a problem is found, inspect for damage to or improper installation of the check valve and vacuum hose. After repairing, inspect again.

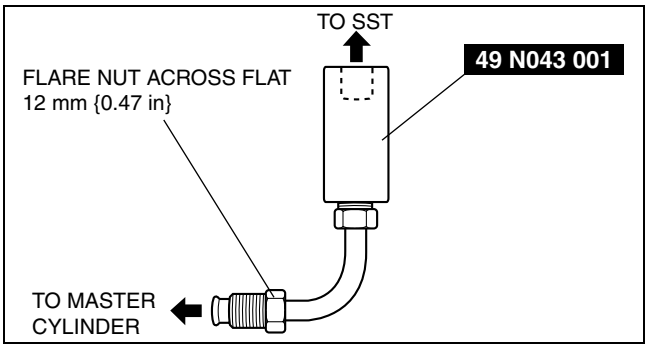
**Vacuum loss function inspection**
1. Start the engine.
2. Depress the pedal with normal force.
3. With the pedal depressed, stop the engine.
4. Hold the pedal depressed for **approx. 30 s**.
5. If the pedal height does not change during this time, the unit is normal.

**Using SST**

**Pre-inspection preparation**

1. Install the **SST** (49 N043 001) to the master cylinder in the orientation shown in the figure.

   **Note**
   - When installing the **SST** (49 N043 001) to the master cylinder, use a commercially available flare nut wrench.
     — Flare nut across flat: **12 mm {0.47 in}**

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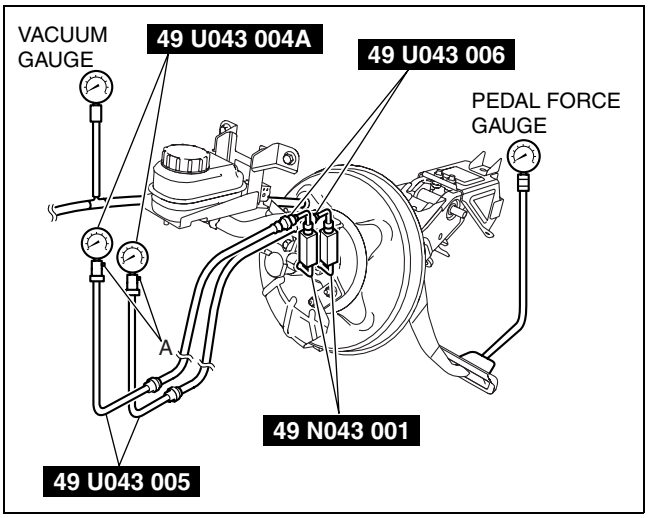
2. Connect the **SSTs**, a vacuum gauge, and a pedal force gauge to the master cylinder, and bleed the air from the **SSTs** and the brake line. (Bleed the air from the **SSTs** using air bleed valve A.)

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**Vacuum loss inspection**

1. Start the engine.
2. Depress the brake pedal with a force of **200 N {20.4 kgf, 44.9 lbf}**.
3. Stop the engine when the vacuum gauge reading reaches **68 kPa {510 mmHg, 20.1 inHg}** with the pedal depressed.
4. With the engine off, observe the vacuum gauge for **15 s**.
5. If the gauge has dropped **3.3 kPa {25 mmHg, 1.0 inHg}** or less, the unit is normal.

**Lack of hydraulic pressure inspection**

1. If the pedal force and fluid pressure correlation is within the specification with the engine stopped and a vacuum amount of **0 kPa {0 mmHg, 0 inHg}**, the system is normal.

**Master cylinder fluid pressure**

| **Vacuum amount at o kPa {0 mmHg, 0 inHg}** | |
|---|---|
| **Pedal force (N {kgf, lbf})** | **Fluid pressure (kPa {kgf/cm2, psi})** |
| 200 N {20.4kgf, 44.9lbt} | 550 kPa {5.61 kgf/cm$^2$, 79.8 psi} or more |

**Hydraulic pressure inspection**

1. Start the engine. Depress the brake pedal when the vacuum reaches **66.7 kPa {500 mmHg, 19.7 inHg}**.
2. At this time, apply the indicated pedal force and if the fluid pressure is within the specification, the unit is normal.

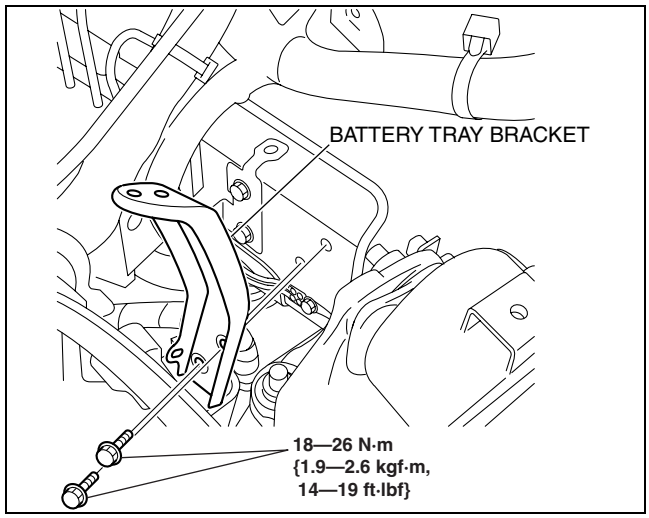
**Master cylinder fluid pressure**

| **Vacuum amount at 66.7 kPa {500 mmHg, 19.7 inHg}** | |
|---|---|
| **Pedal force (N {kgf, lbf})** | **Fluid pressure (kPa {kgf/cm2, psi})** |
| 200 N {20.4kgf, 44.9lbt} | 6,950 kPa {70.88 kgf/cm$^2$, 1.009 psi} or more |

## POWER BRAKE UNIT REMOVAL/INSTALLATION

id041100801800

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove the battery tray bracket as shown in the figure.
3. Remove the master cylinder component. (See 04-11-10 MASTER CYLINDER REMOVAL/ INSTALLATION.)

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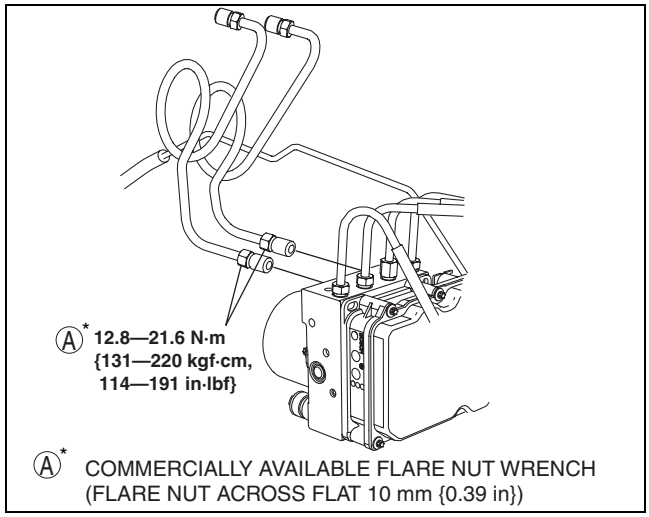
4. Remove the brake pipe as shown in the figure.
5. Remove the accelerator pedal. (See 01-13-17 ACCELERATOR PEDAL REMOVAL/ INSTALLATION[L3 WITH TC].)
6. Remove in the order indicated in the table.

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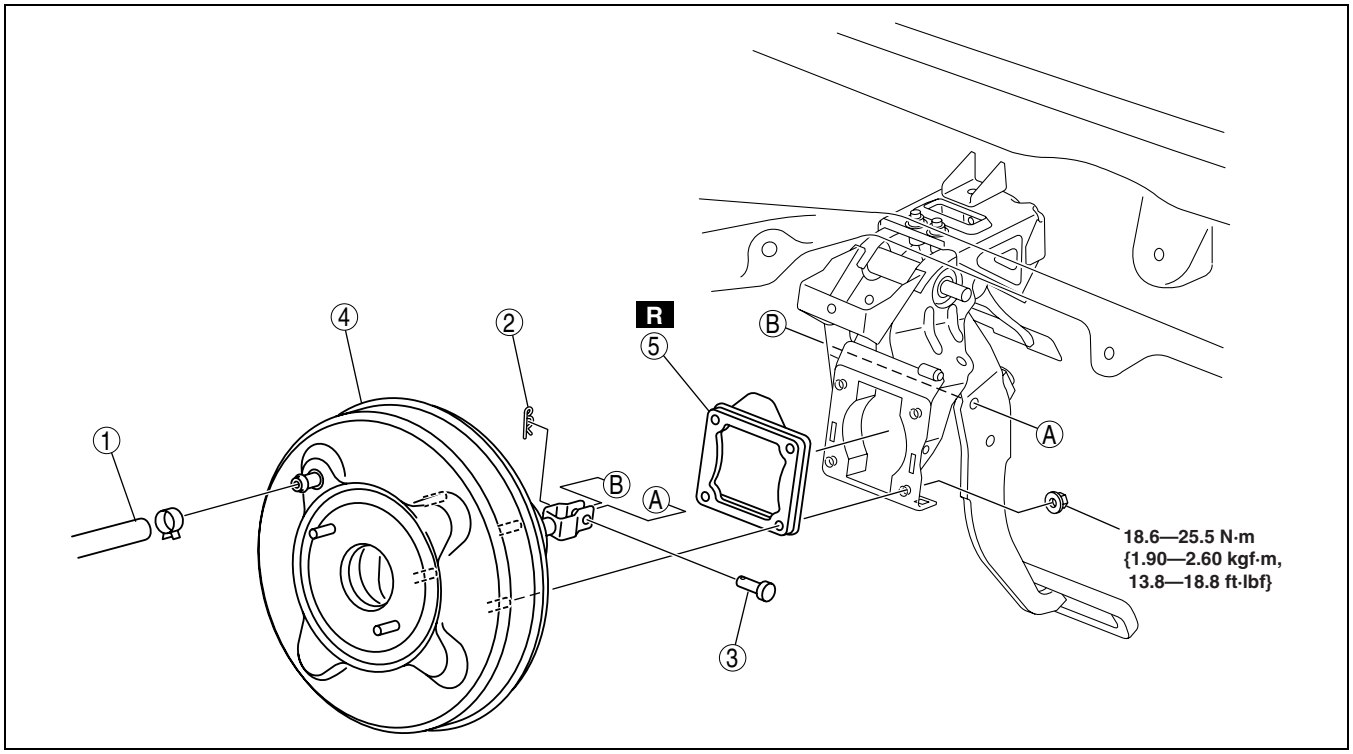
7. Install in the reverse order of removal.
8. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)
9. Inspect the brake pedal. (See 04-11-4 BRAKE PEDAL INSPECTION.)

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| | |
|---|---|
| 1 | Vacuum hose |
| 2 | Snap pin |
| 3 | Clevis pin |

| | |
|---|---|
| 4 | Power brake unit |
| 5 | Gasket |

**FRONT BRAKE (DISC) INSPECTION**

id041100800800

**Brake Judder Repair Hint**
**Description**
Brake judder concern has the following three characteristics:

**Steering wheel vibration**
Steering wheel vibrates in the direction of its rotation. This characteristic is most noticeable when applying brakes at a vehicle speed of **100— 140 km/h {62— 87 mph}**.

**Floor vibration**
When applying brakes, the vehicle body shakes back and forth. The seriousness of shake is not influenced by vehicle speed.

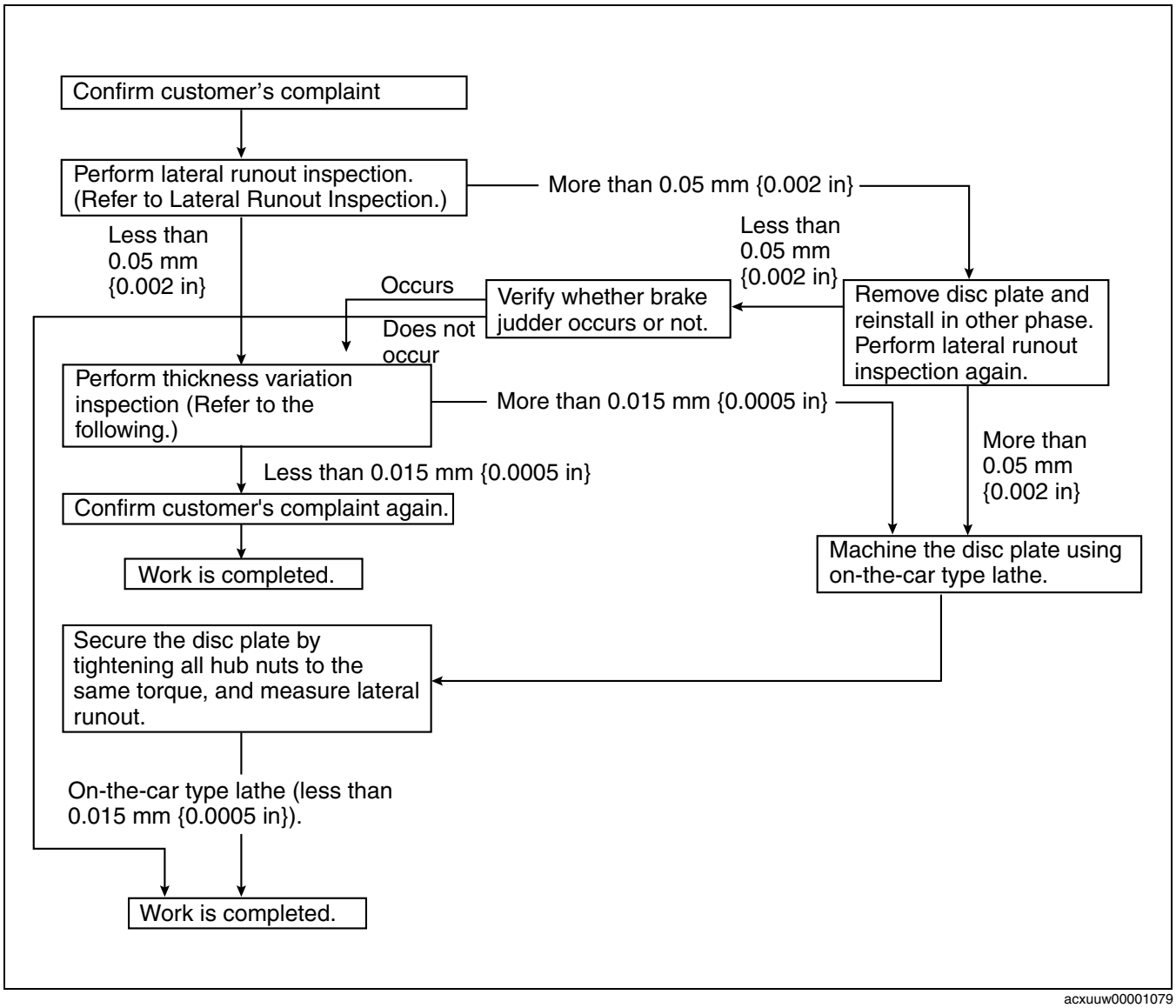
**Brake pedal vibration**
When applying brakes, a pulsating force tries to push the brake pad back. The pulsation is transmitted to the brake pedal.
The following are the main possible causes of brake judder:

**Due to an excessive runout (side-to-side wobble) of disc plate, the thickness of disc plate is uneven.**
If the runout is **more than 0.05 mm {0.002 in}** at the position **10 mm {0.39 in}** from the disc plate edge, uneven wear occurs on the disc plate because of uneven pad/plate contact.
If the runout is **less than 0.05 mm {0.002 in}**, uneven wear does not occur.

**The disc plate is deformed by heat.**
Repeated panic braking may raise the temperature in some portions of disc plate by **approx. 1,000 °C {1,832 °F}**. This results in deformed disc plate.

**Due to corrosion, the thickness and friction coefficient of disc plate change.**
If a vehicle is parked under damp conditions for a long time, corrosion occurs on the friction surface of disc plate. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

**Inspection and repair procedure**

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**Lateral runout inspection**

1. To secure the disc plate and the hub, tighten the hub nuts upside down or insert a washer (thickness **10 mm {0.39 in}** with an inner diameter **more than 12 mm {0.47 in}**) between the hub bolt and the hub nut.

   **Note**
   - The component parts of the **SST** (49 B017 001 or 49 G019 003) can be used as a suitable washer.

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.39 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

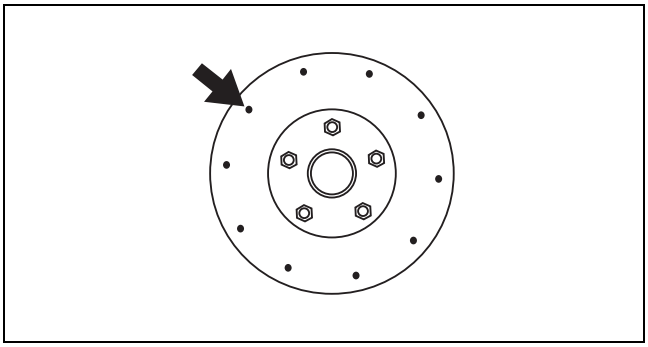
   **Front disc plate runout limit**
   **0.05 mm {0.002 in}**

**Thickness variation inspection**

1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in the illustration using a caliper (micrometer).
3. Subtract the minimum value from the maximum.
   - If the result is not within specification, machine the disc plate using a lathe.

**Thickness variation limit**
**0.015 mm {0.0005 in}**

**Warning**
- **Do not exceed minimum disc plate thickness.**



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**Disc Plate Thickness Inspection**

**Caution**
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

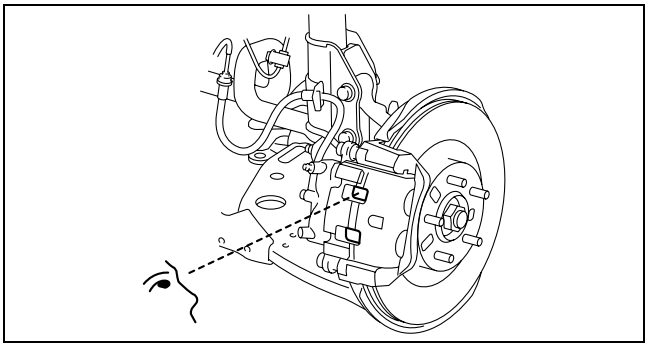
**Minimum front disc plate thickness**
**26 mm {1.03 in}**

**Minimum front disc plate thickness after machining using a brake lathe on-vehicle**
**26.8 mm {1.06 in}**

**Disc Pad Thickness Inspection**

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove the wheels.
3. Verify the remaining thickness of the pads.
   - Replace the pads as a set: right and left wheels, if either one is at or less than the minimum thickness.

**Minimum front disc pad thickness**
**2.0 mm {0.08 in}**



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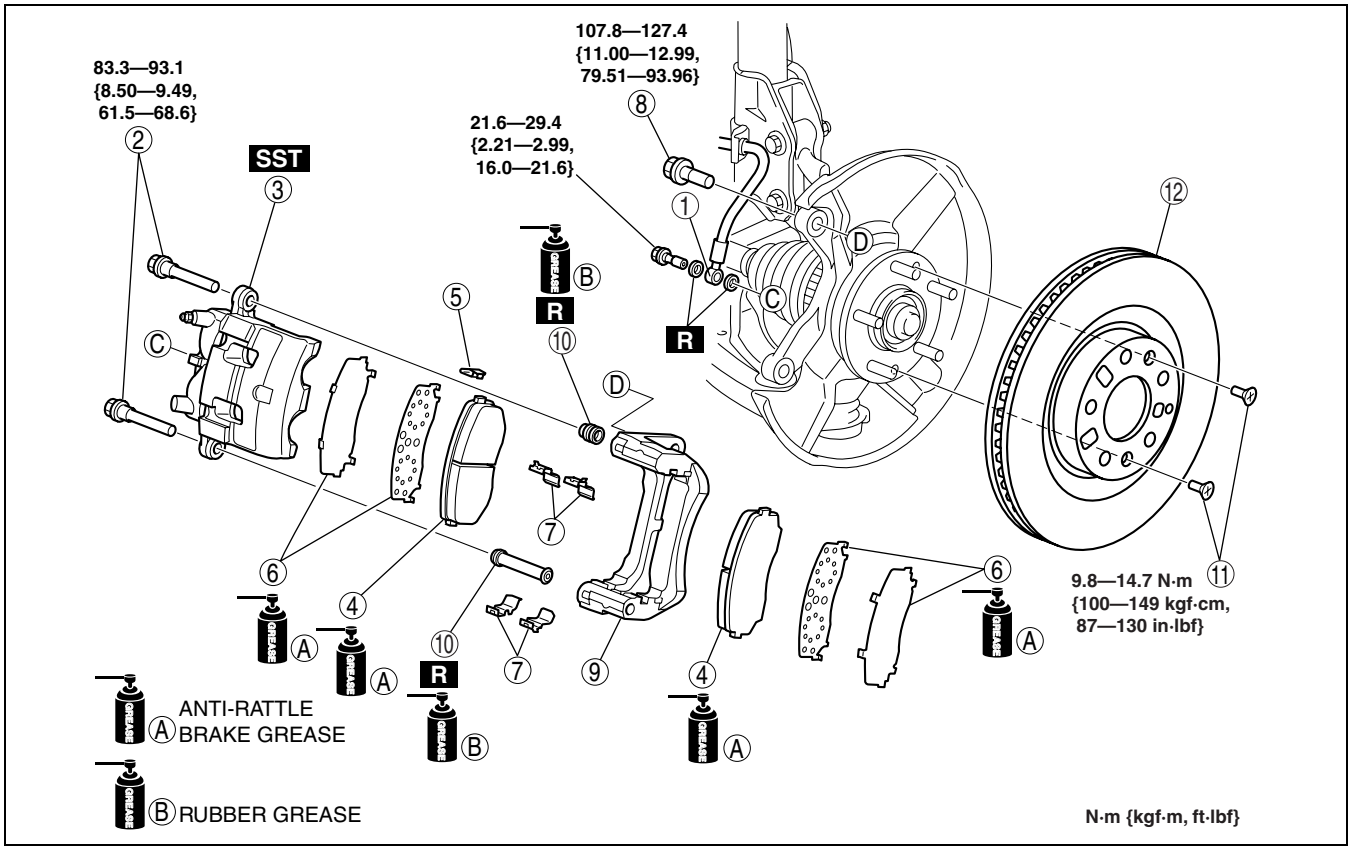
## FRONT BRAKE (DISC) REMOVAL/INSTALLATION

id041100800900

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)
4. After installation, depress the brake pedal a few times, rotate the wheel by hand, and verify that the brake does not drag.

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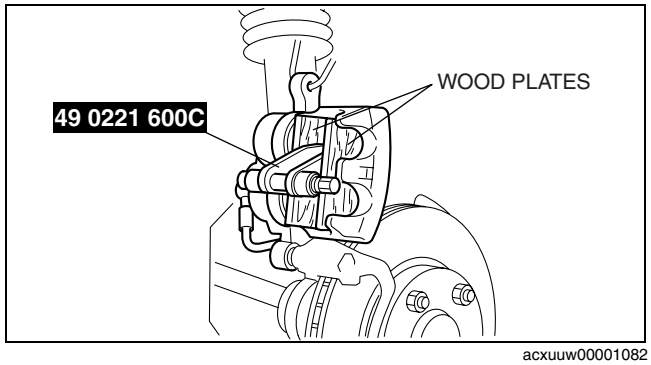
| | |
|---|---|
| 1 | Brake hose |
| 2 | Slide pin bolt |
| 3 | Caliper<br>(See 04-11-17 Caliper Installation Note.) |
| 4 | Disc pad |
| 5 | Pad wear indicator |
| 6 | Shim |

| | |
|---|---|
| 7 | Guide plate |
| 8 | Bolt |
| 9 | Mounting support |
| 10 | Dust boot |
| 11 | Screw |
| 12 | Disc plate |

### Caliper Installation Note

1. Push the piston fully inward using the **SST.**
2. Install the caliper.

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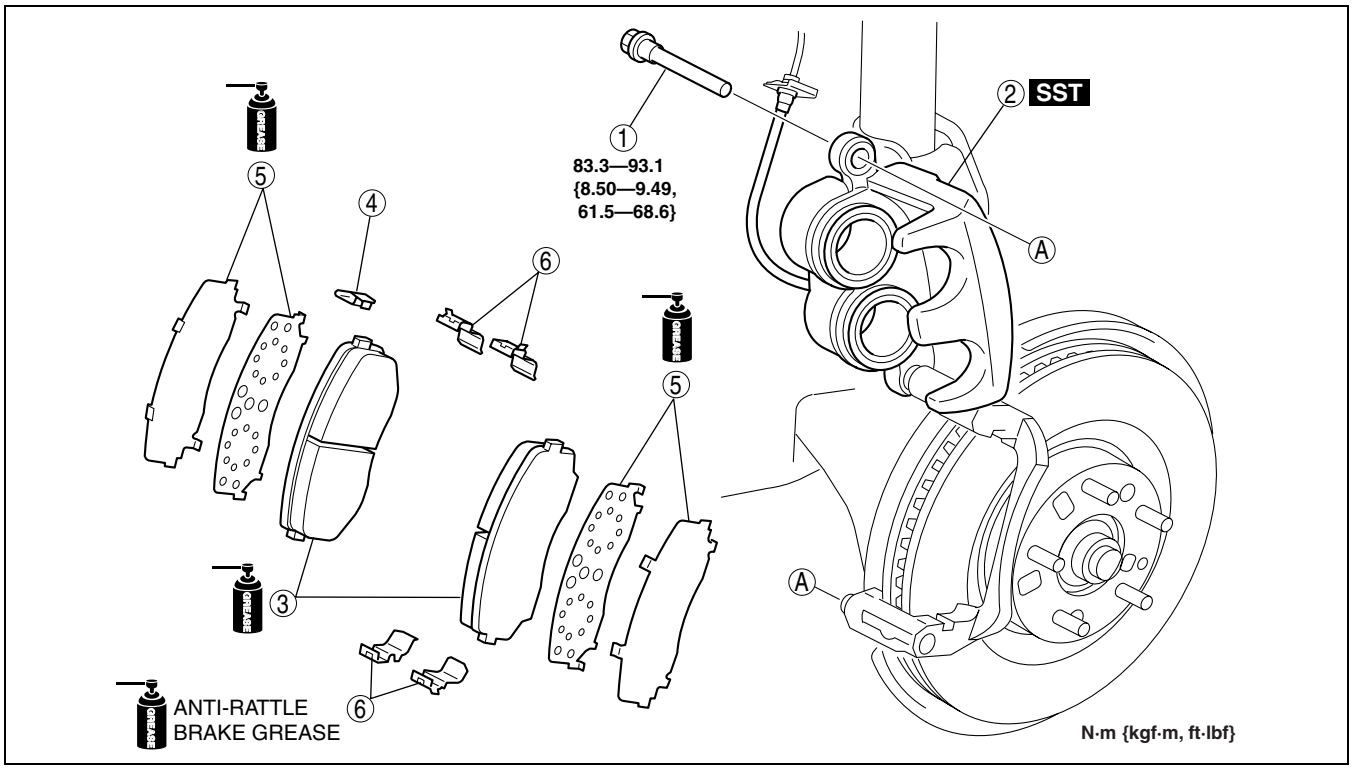
## DISC PAD (FRONT) REPLACEMENT

id041100800700

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, rotate the wheel by hand, and verify that the brake does not drag.

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| | |
|---|---|
| 1 | Slide pin bolt |
| 2 | Caliper<br>(See 04-11-17 FRONT BRAKE (DISC) REMOVAL/ INSTALLATION.) |
| 3 | Disc pad |
| 4 | Pad wear indicator |
| 5 | Shim |
| 6 | Guide plate |

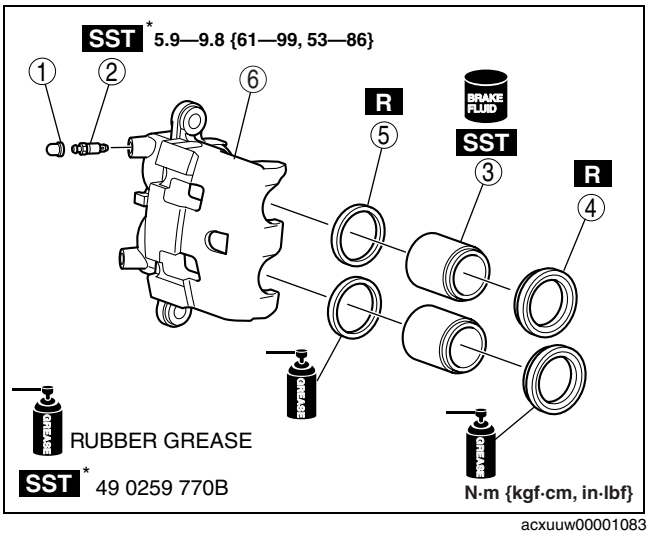
## CALIPER (FRONT) DISASSEMBLY/ASSEMBLY

id041100801000

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Bleeder cap |
| 2 | Bleeder screw |
| 3 | Piston<br>(See 04-11-19 Piston Disassembly Note.) |
| 4 | Dust seal |
| 5 | Piston seal |
| 6 | Caliper |

2. Assemble in the reverse order of removal.

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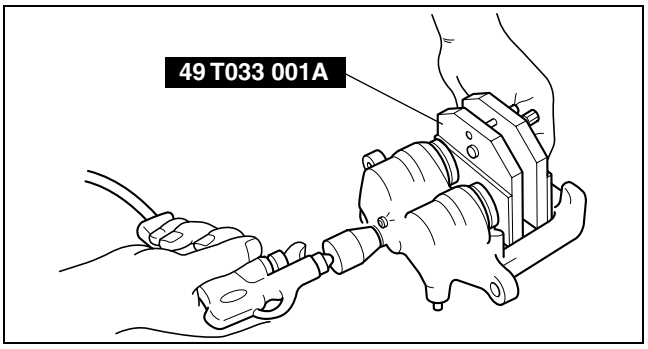
**Piston Disassembly Note**

**Warning**
- **When compressed air is blown into the caliper body, injury to a finger or other part from pinching could result from the piston springing up. When blowing in compressed air, do not place your fingers between the piston and caliper body when performing the work.**

**Caution**
- **The piston could be damaged if blown out with great force. Blow the compressed air slowly to prevent the piston from suddenly popping out.**

1. Place the **SST** in the caliper, then blow compressed air through the hole to force the piston out of the caliper.

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**REAR BRAKE (DISC) INSPECTION**

id041100800400

**Brake Judder Repair Hint**
**Description**
Brake judder concern has the following three characteristics:

**Steering wheel vibration**
Steering wheel vibrates in the direction of its rotation. This characteristic is most noticeable when applying brakes at a vehicle speed of **100— 140 km/h {62— 87 mph}**.

**Floor vibration**
When applying brakes, the vehicle body shakes back and forth. The seriousness of shake is not influenced by vehicle speed.

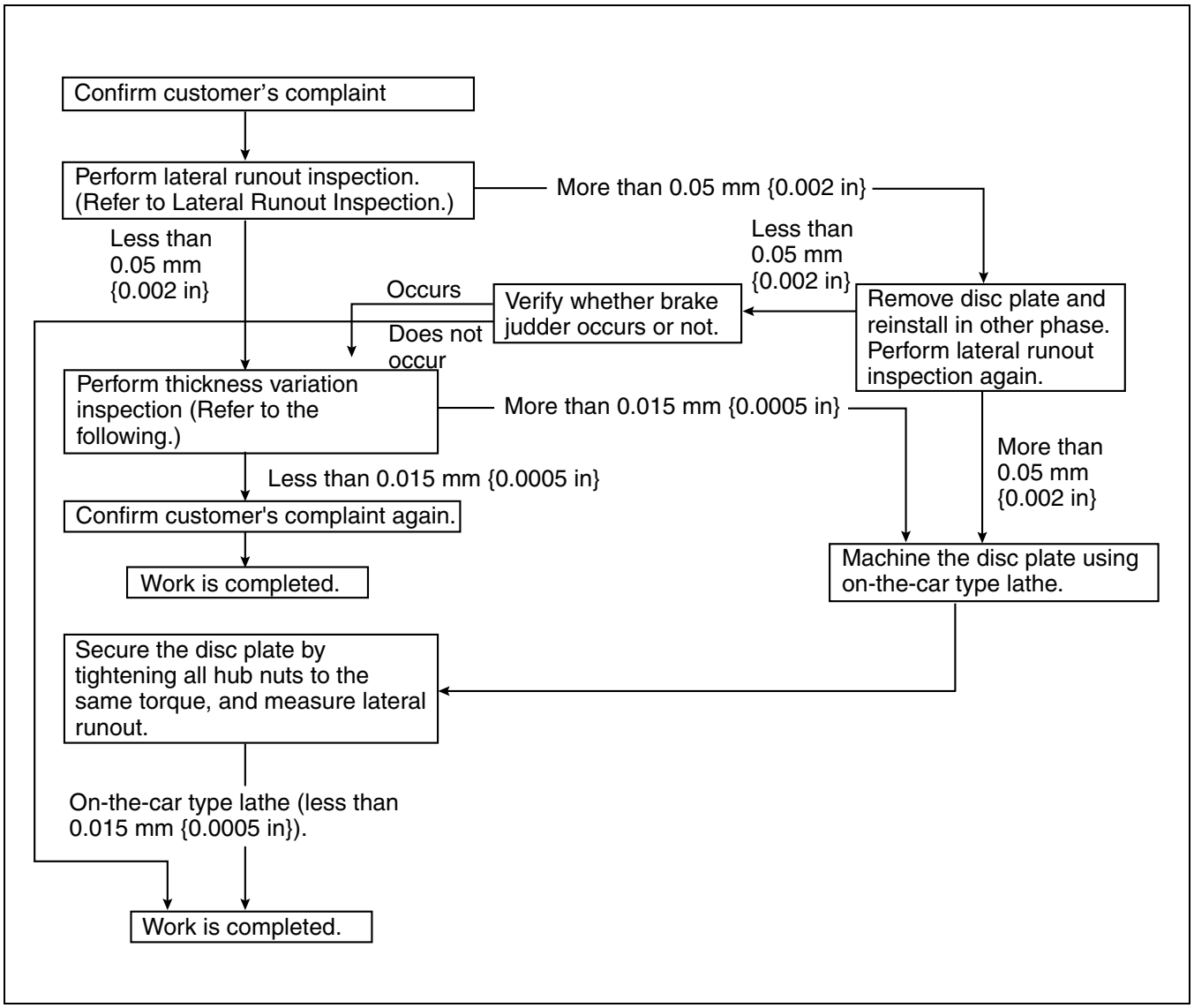
**Brake pedal vibration**
When applying brakes, a pulsating force tries to push the brake pad back. The pulsation is transmitted to the brake pedal.
The following are the main possible causes of brake judder:

**Due to an excessive runout (side-to-side wobble) of disc plate, the thickness of disc plate is uneven.**
If the runout is **more than 0.05 mm {0.002 in}** at the position **10 mm {0.39 in}** from the disc plate edge, uneven wear occurs on the disc plate because of uneven pad/plate contact.
If the runout is **less than 0.05 mm {0.002 in}**, uneven wear does not occur.

**The disc plate is deformed by heat.**
Repeated panic braking may raise the temperature in some portions of disc plate by **approx. 1,000 °C {1,832 °F}**. This results in deformed disc plate.

**Due to corrosion, the thickness and friction coefficient of disc plate change.**
If a vehicle is parked under damp conditions for a long time, corrosion occurs on the friction surface of disc plate. The thickness of corrosion is uneven and sometimes appears like a wave pattern, which changes the friction coefficient and causes a reaction force.

**Inspection and repair procedure**

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**Lateral runout inspection**

1. To secure the disc plate and the hub, tighten the hub nuts upside down or insert a washer (thickness **10 mm {0.39 in}** with an inner diameter **more than 12 mm {0.47 in}**) between the hub bolt and the hub nut.

   **Note**
   - The component parts of the **SST** (49 B017 001 or 49 G019 003) can be used as a suitable washer.

2. After tightening all the hub nuts to the same torque, put the dial gauge on the friction surface of disc plate **10 mm {0.39 in}** from the disc plate edge.
3. Rotate the disc plate one time and measure the runout.

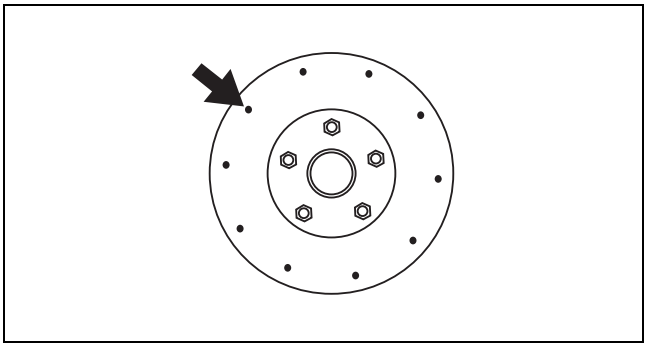
   **Rear disc plate runout limit**
   **0.05 mm {0.002 in}**

**Thickness variation inspection**

1. Clean the disc plate-to-pad friction surface using a brake cleaner.
2. Measure the points indicated in the illustration using a caliper (micrometer).
3. Subtract the minimum value from the maximum.
   - If the result is not within specification, machine the disc plate using a lathe.

**Thickness variation limit**
**0.015 mm {0.0005 in}**

**Warning**
- **Do not exceed minimum disc plate thickness.**



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**Disc Plate Thickness Inspection**

**Caution**
- **Excessive runout may result if the disc plate is removed from the vehicle then machined. Machine the disc plate while installed on the vehicle.**

1. Measure the thickness of the disc plate.
   - If the thickness is not within the specification, replace the disc plate.

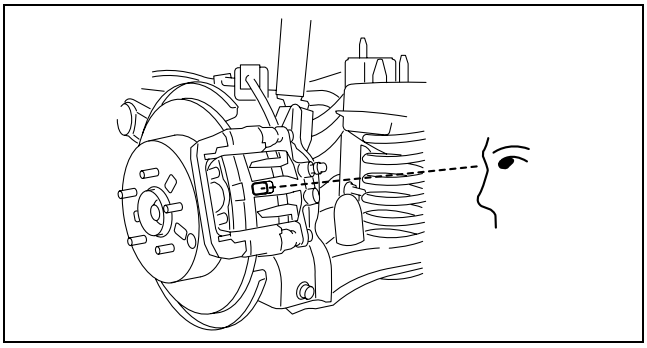
**Minimum rear disc plate thickness**
**16 mm {0.63 in}**

**Minimum rear disc plate thickness after machining using a brake lathe on-vehicle**
**16.8 mm {0.66 in}**

**Disc Pad Thickness Inspection**

1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the wheels.
3. Verify the remaining thickness of the pads.
   - Replace the pads as a set: right and left wheels, if either one is at or less than the minimum thickness.

**Minimum rear disc pad thickness**
**2.0 mm {0.08 in}**



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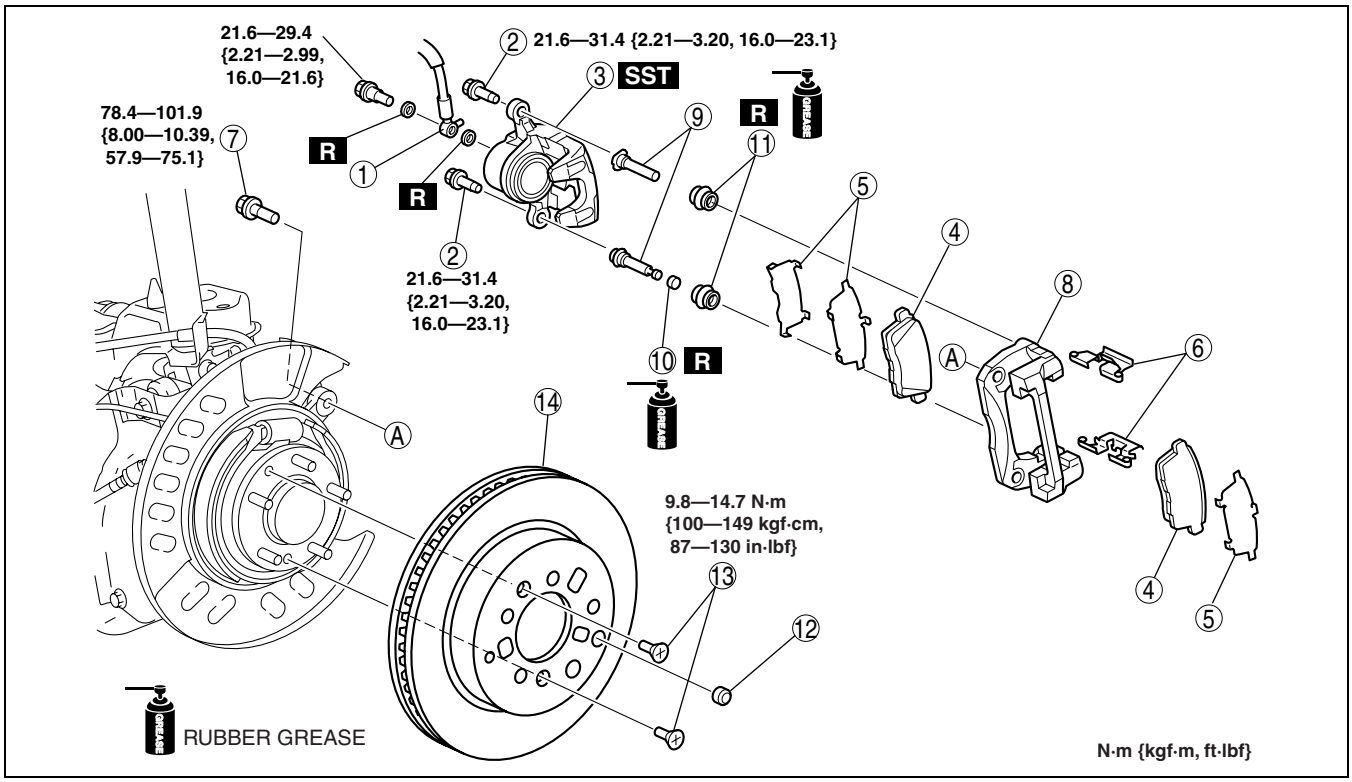
## REAR BRAKE (DISC) REMOVAL/INSTALLATION

id041100800500

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)
4. After installation, do the following.
   (1) Depress the brake pedal a few times. Then verify that the brakes do not drag.
   (2) Inspect the parking brake pedal stroke. (See 04-12-2 PARKING BRAKE INSPECTION.)

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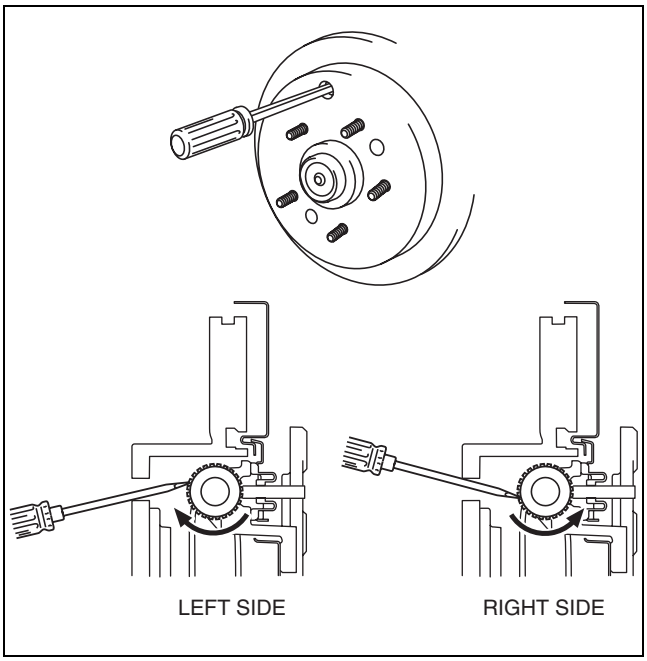
| | |
|---|---|
| 1 | Brake hose |
| 2 | Bolt |
| 3 | Caliper<br>(See 04-11-24 Caliper Installation Note.) |
| 4 | Disc pad |
| 5 | Shim |
| 6 | Guide plate |
| 7 | Bolt |
| 8 | Mounting support |

| | |
|---|---|
| 9 | Slide pin |
| 10 | Bush |
| 11 | Dust boot |
| 12 | Plug |
| 13 | Screw<br>(See 04-11-23 Disc Plate, Screw Installation Note.) |
| 14 | Disc plate<br>(See 04-11-23 Disc Plate Removal Note.)<br>(See 04-11-23 Disc Plate, Screw Installation Note.) |

**Disc Plate Removal Note**

1. If any disc plate is difficult to remove, perform the following steps to remove it.
   (1) Insert a flathead screwdriver into the service hole and turn the adjuster in the direction of the arrow to compress the parking brake shoe.
   (2) Remove the disc plate.

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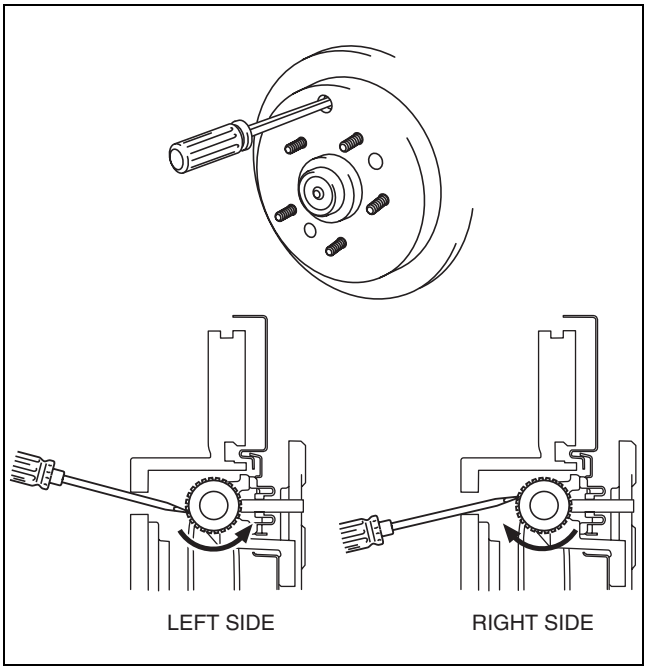
**Disc Plate, Screw Installation Note**

1. Install the disc plate and the screws.
2. Perform the following steps to adjust the shoe clearance after installing the disc plate and the screws.
   (1) Insert a flathead screwdriver into the service hole and turn the adjuster in the direction of the arrow to expand the parking brake shoe until the disc plate cannot rotate.

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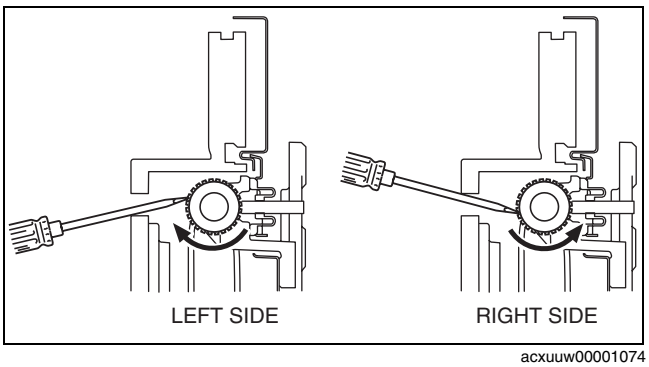
   (2) Return the adjuster **13—17 notches** in the direction of the arrow.

   **Note**
   - Shoe clearance can be adjusted to **0.15 mm {0.006 in}** by returning the adjuster **15 notches**.

   (3) Rotate the disc plate and make sure it does not drag.

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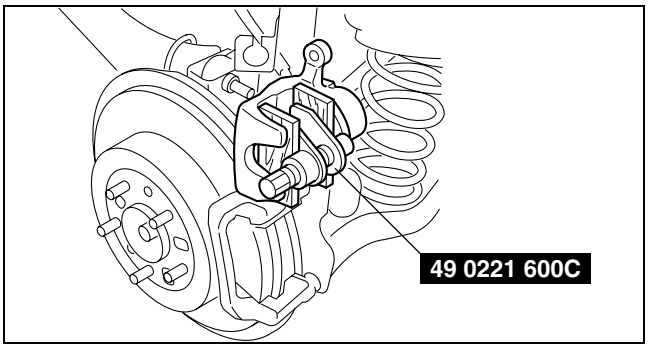
**Caliper Installation Note**

1. Push the piston fully inward using the **SST.**
2. Install the caliper.

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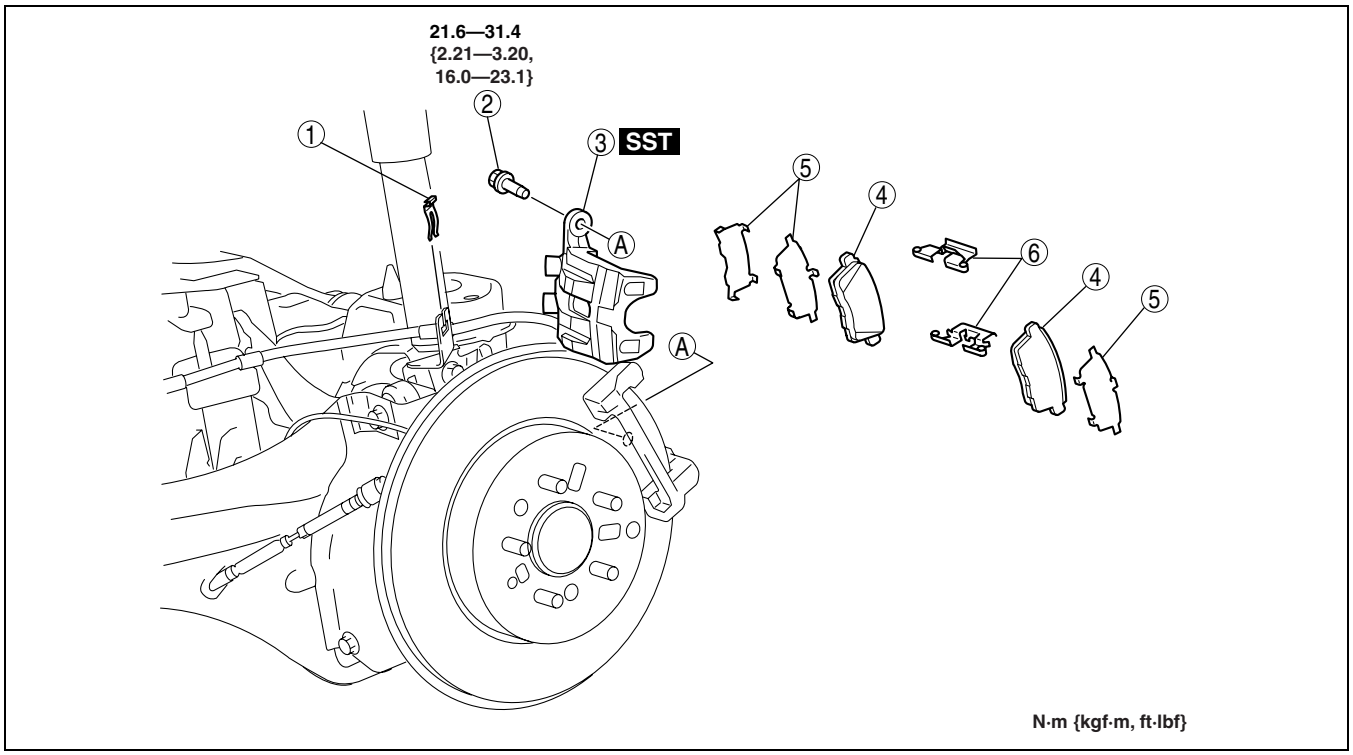
**DISC PAD (REAR) REPLACEMENT**

id041100800300

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. After installation, depress the brake pedal a few times, rotate the wheel by hand, and verify that the brake does not drag.

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| | |
|---|---|
| 1 | Clip |
| 2 | Bolt |
| 3 | Caliper<br>(See 04-11-22 REAR BRAKE (DISC) REMOVAL/ INSTALLATION) |

| | |
|---|---|
| 4 | Disc pad |
| 5 | Shim |
| 6 | Guide plate |

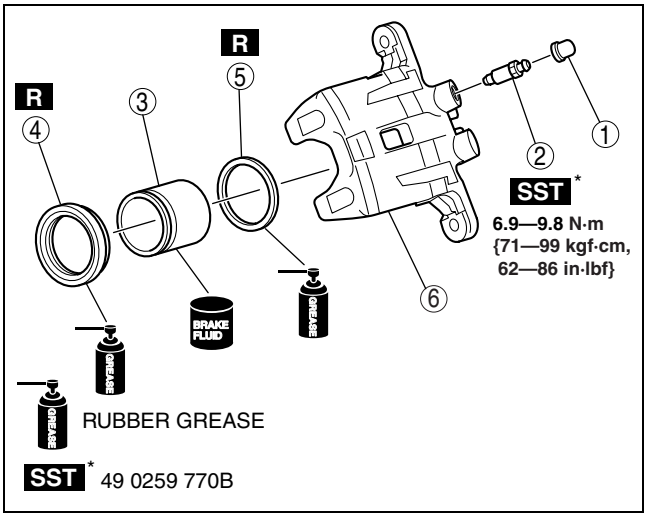
## CALIPER (REAR) DISASSEMBLY/ASSEMBLY

id041100800600

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Bleeder cap |
| 2 | Bleeder screw |
| 3 | Piston<br>(See 04-11-25 Piston Disassembly Note) |
| 4 | Dust seal |
| 5 | Piston seal |
| 6 | Caliper |

2. Assemble in the reverse order of removal.

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### Piston Disassembly Note

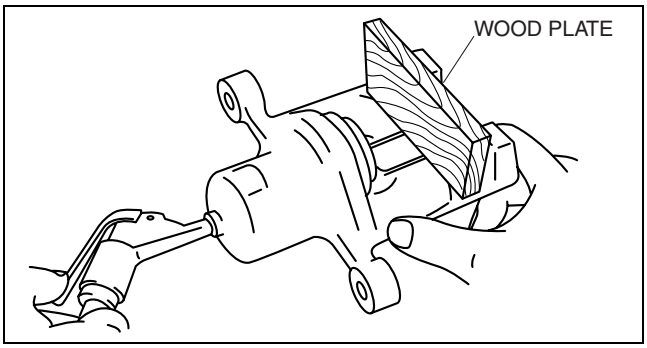
**Warning**

- **When compressed air is blown into the caliper body, injury to a finger or other part from pinching could result from the piston springing up. When blowing in compressed air, do not place your fingers between the piston and caliper body when performing the work.**

**Caution**

- **The piston could be damaged if blown out with great force. Blow the compressed air slowly to prevent the piston from suddenly popping out.**

1. Place a piece of wood in the caliper, then blow compressed air through the hole to force the piston out of the caliper.

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# 04-12 PARKING BRAKE SYSTEM

**PARKING BRAKE SYSTEM**
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**PARKING BRAKE INSPECTION . . . . . 04-12–2**
**PARKING BRAKE ADJUSTMENT . . . . . 04-12–2**
**PARKING BRAKE**
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Disc Plate Removal Note . . . . . **04-12–5**
Parking Brake Shoe Removal Note . . . **04-12–6**
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Bolt and Nut, Tappet
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Parking Brake Shoe Removal Note. . . . **04-12–11**
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**PARKING BRAKE SWITCH**
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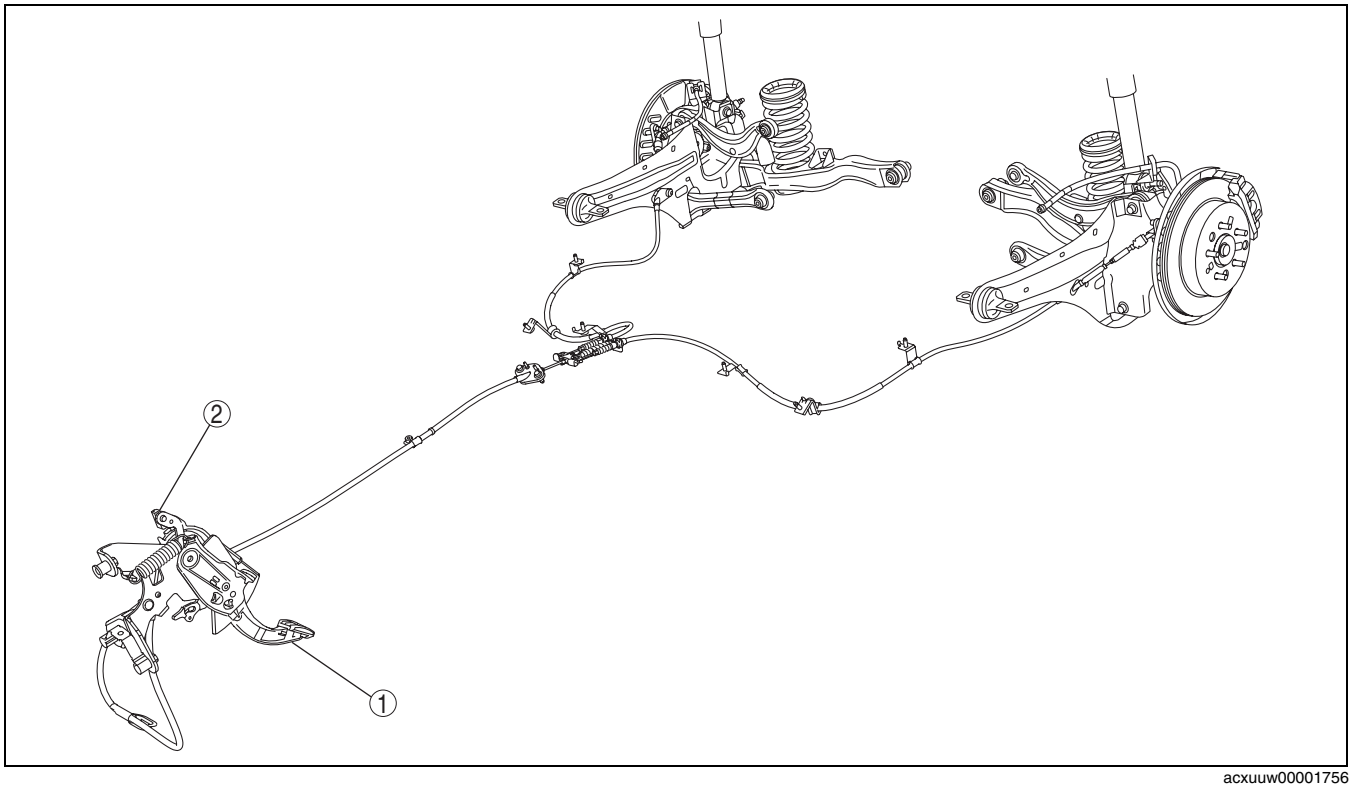
## PARKING BRAKE SYSTEM LOCATION INDEX

id041200800100

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| | |
|---|---|
| 1 | Parking brake (pedal type)<br>(See 04-12-2 PARKING BRAKE INSPECTION.)<br>(See 04-12-2 PARKING BRAKE ADJUSTMENT.)<br>(See 04-12-3 PARKING BRAKE REMOVAL/ INSTALLATION[2WD].)<br>(See 04-12-8 PARKING BRAKE REMOVAL/ INSTALLATION[AWD].) |

| | |
|---|---|
| 2 | Parking brake switch<br>(See 04-12-13 PARKING BRAKE SWITCH INSPECTION.) |

## PARKING BRAKE INSPECTION

id041200800300

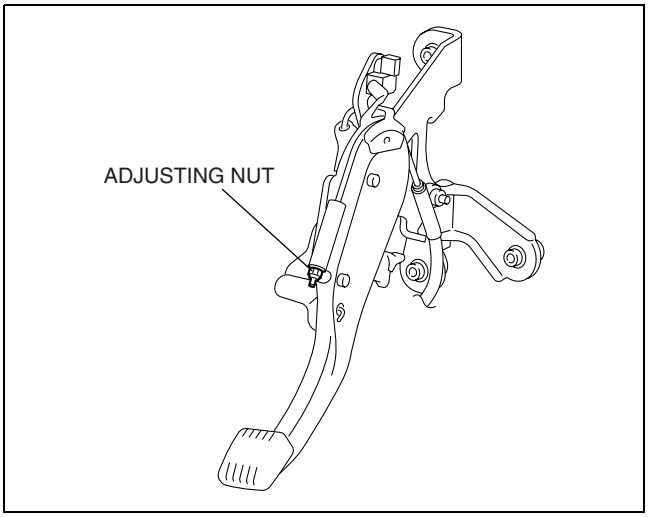
1. Depress the parking brake pedal a few times.
2. Depress the brake pedal a few times.
3. Inspect the parking brake stroke by depressing the parking brake pedal with a force of **180 N {18.4 kgf, 40.5 lbf}**.

**Parking brake pedal stroke when depressed at 180 N {18.4 kgf, 40.5 lbf}**
**1— 3 notches**

## PARKING BRAKE ADJUSTMENT

id041200800400

1. Start the engine and depress the parking brake pedal several times.
2. Stop the engine.
3. Turn the adjusting nut at the front of the parking cable.
4. After adjustment, inspect the following points:
   (1) Turn the ignition switch on, depress the parking brake pedal one notch, and verify that the brake system warning light illuminates.
   (2) Verify that the rear brakes do not drag.

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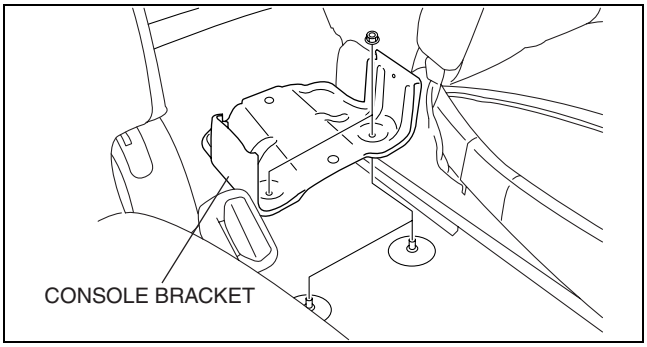
## PARKING BRAKE REMOVAL/INSTALLATION[2WD]

id0412008002a1

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Perform the following procedure and remove the parking brake pedal.
   (1) Remove the lower panel. (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
2. Perform the following procedure and remove the front parking brake cable.
   (1) Remove the lower panel. (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (2) Remove the joint cover. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (3) Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Remove the console bracket as shown in the figure.
   (6) Turn the floor covering over until the front parking brake cable cover appears.

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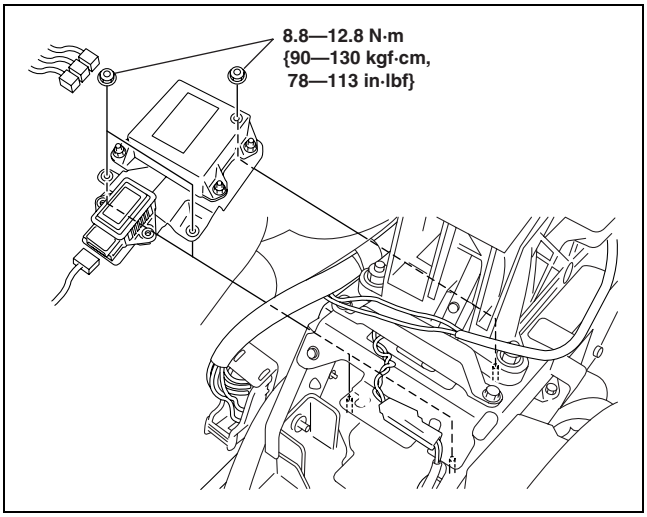
   (7) Disconnect the combined sensor connector and the SAS control module connector.
   (8) Remove the sensor bracket component shown in the figure.
   (9) Remove the insulator.
3. Perform the following procedure and remove the rear parking brake cable.
   (1) Remove the insulator.
4. Perform the following procedure and remove the parking brake plate, back plate and wheel hub.
   (1) Remove the rear ABS wheel-speed sensor from the rear wheel hub. (See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)

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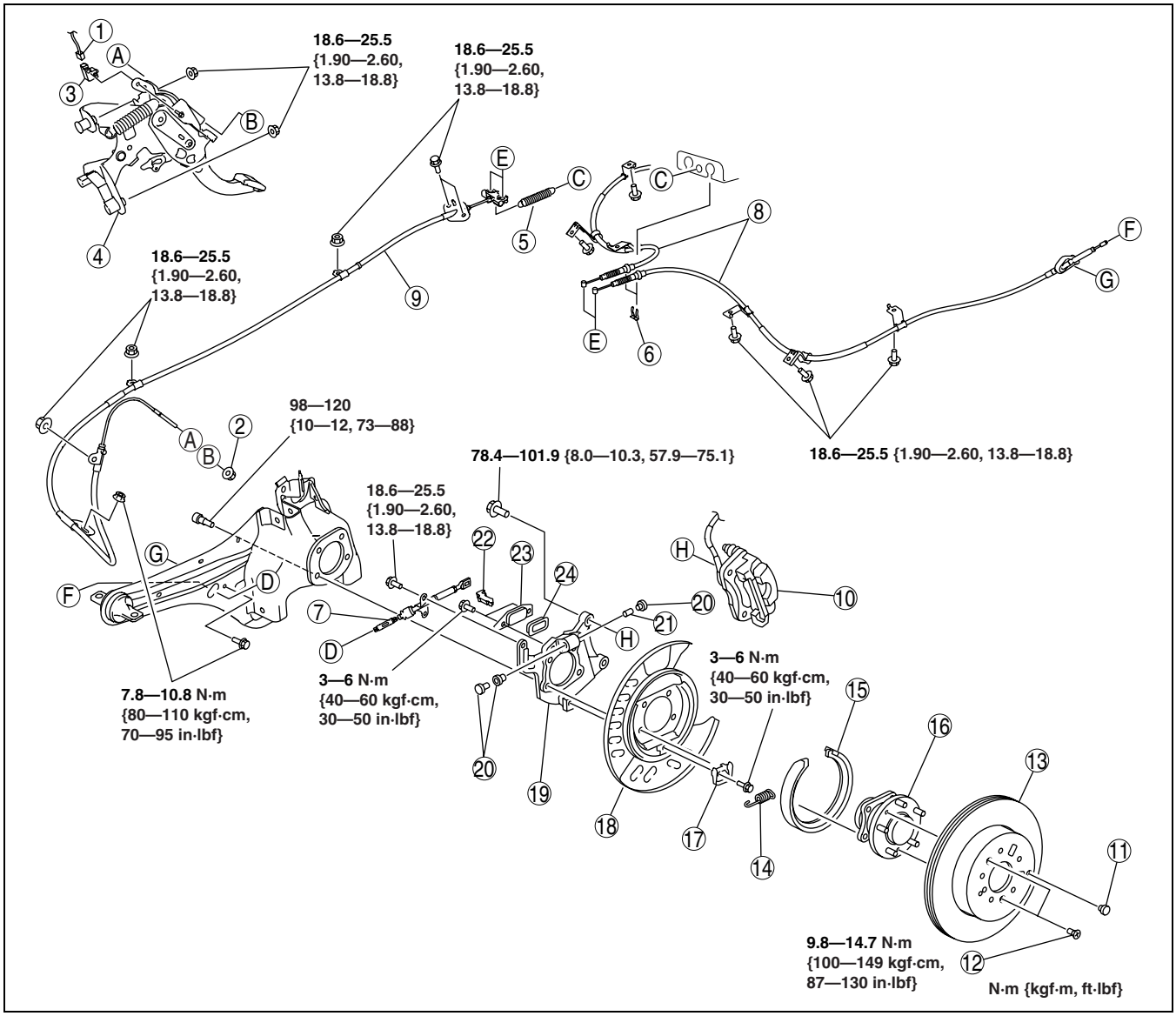
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Adjust the parking brake stroke. (See 04-12-2 PARKING BRAKE ADJUSTMENT.)

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| | |
|---|---|
| 1 | Parking brake switch connector |
| 2 | Adjusting nut |
| 3 | Parking brake switch |
| 4 | Parking brake pedal |
| 5 | Spring |
| 6 | Clip |
| 7 | End cable<br>(See 04-12-5 End Cable Removal Note.)<br>(See 04-12-7 End Cable Installation Note.) |
| 8 | Rear parking brake cable |
| 9 | Front Parking brake cable, equalizer |
| 10 | Brake caliper component<br>(See 04-12-5 Brake Caliper Component Removal Note) |
| 11 | Plug |
| 12 | Screw<br>(See 04-12-7 Disc Plate, Screw Installation Note) |

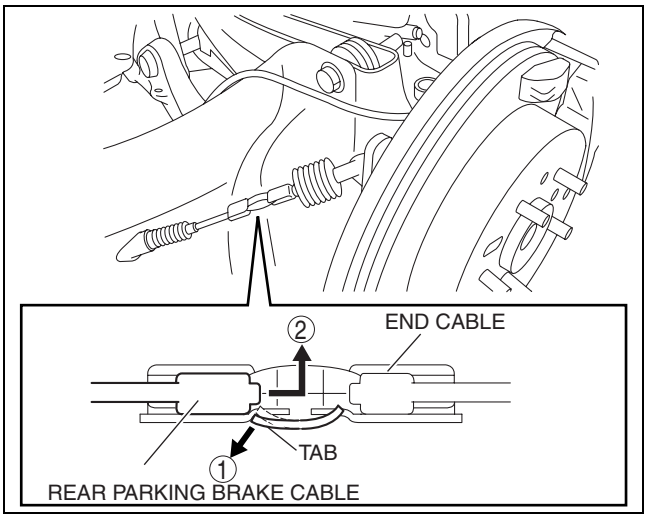
| | |
|---|---|
| 13 | Disc plate<br>(See 04-12-5 Disc Plate Removal Note)<br>(See 04-12-7 Disc Plate, Screw Installation Note) |
| 14 | Spring |
| 15 | Parking brake shoe<br>(See 04-12-6 Parking Brake Shoe Removal Note)<br>(See 04-12-6 Parking Brake Shoe Installation Note) |
| 16 | Rear wheel hub component |
| 17 | Shoe stopper |
| 18 | Backing plate |
| 19 | Parking brake plate |
| 20 | Adjuster bolt and nut, tappet<br>(See 04-12-6 Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note) |
| 21 | Pin<br>(See 04-12-6 Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note.) |

| | |
|---|---|
| 22 | Operation lever<br>(See 04-12-6 Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note.) |

| | |
|---|---|
| 23 | Plate |
| 24 | Dust boot |

**End Cable Removal Note**

1. Remove the end cable installation bolts.
2. Disconnect the end cable from the operation lever.
3. Bend the end cable tab (rear parking brake cable side) in the direction shown in the figure.
4. Move the rear parking brake cable end in the direction shown in the figure and disconnect it from the end cable.
5. Remove the end cable.

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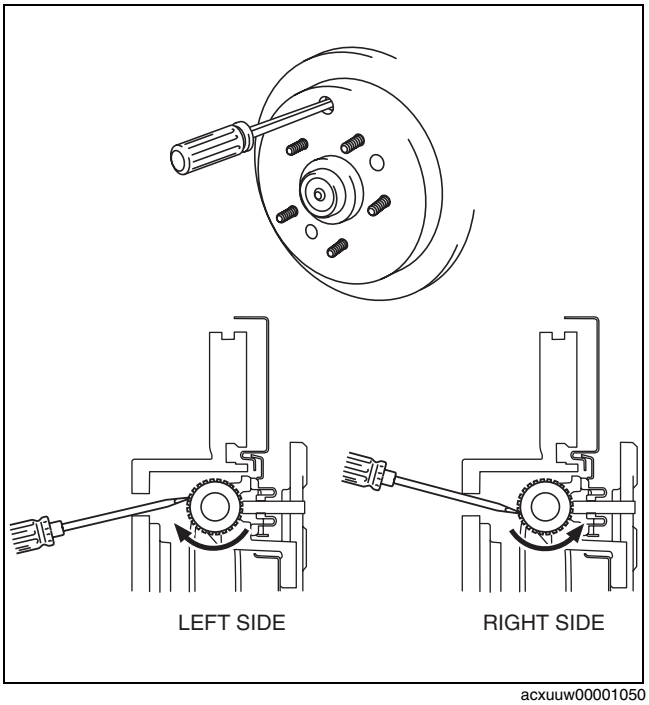
**Brake Caliper Component Removal Note**

1. Remove the brake caliper assembly from the trailing link and suspend it with a cable so it does not interfere.

**Disc Plate Removal Note**

1. If any disc plate is difficult to remove, perform the following steps to remove it.
   (1) Insert a flathead screwdriver into the service hole and turn the adjuster in the direction of the arrow to compress the parking brake shoe.
   (2) Remove the disc plate.

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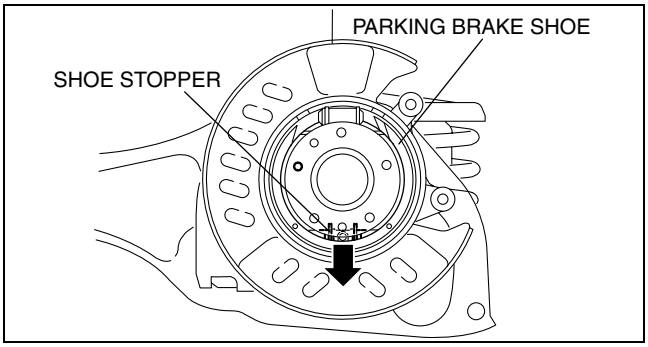
**Parking Brake Shoe Removal Note**

1. Pull the parking brake shoe downward and disengage it from the shoe stopper.
2. Press the adjuster bolt and tappet by hand, and slowly remove the parking brake shoe.

**Note**

- When removing the parking brake shoe, firmly press the adjuster bolt and tappet by hand and slowly remove the parking brake shoe to prevent the adjuster bolt, tappet, operation lever and other parts from flying off.



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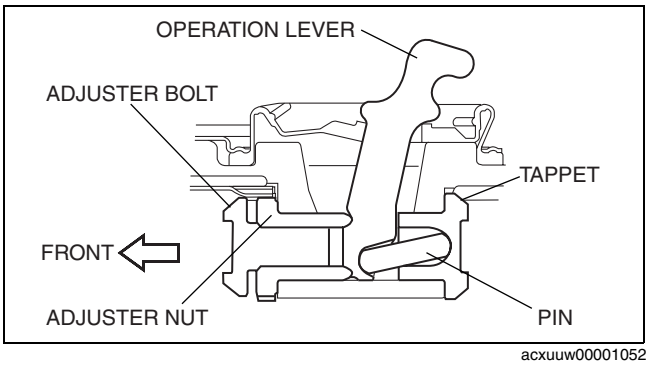
**Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note**

1. Install the operation lever, pin, adjuster bolt and nut, and tappet so that the adjuster nut is facing toward the vehicle front.
2. Completely tighten the adjuster bolt and nut.
3. Move the operation lever by hand and verify that it operates properly.
   - If proper operation cannot be verified, reinstall.



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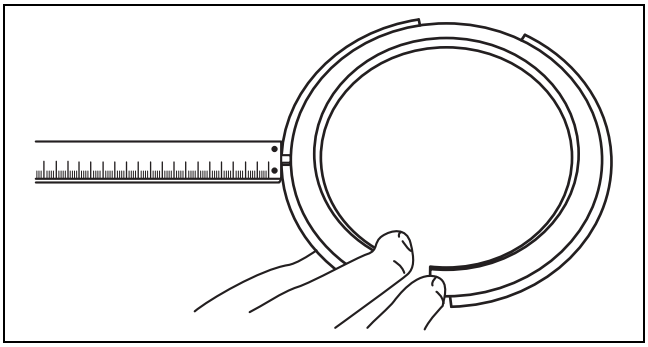
**Parking Brake Shoe Installation Note**

1. Measure the parking brake lining thickness with a vernier caliper or measuring scale.
   - If it is less than the minimum thickness, install a new parking brake shoe.

**Minimum parking brake shoe thickness**
**1.0 mm {0.04 in}**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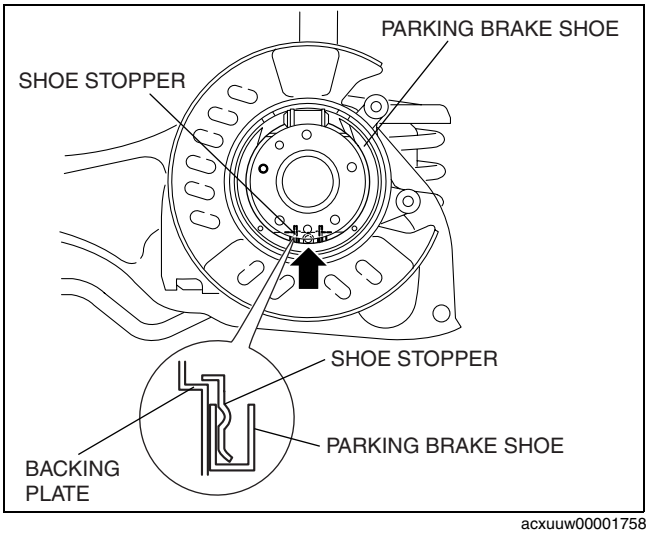
2. After installing the opening of the parking brake shoe to the adjuster bolt and tappet, push the brake shoe upward and attach it to the shoe stopper.



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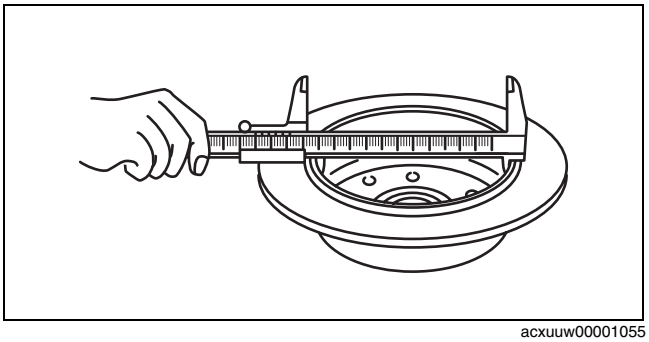
**Disc Plate, Screw Installation Note**

1. Measure the inner diameter of the disc plate with a vernier caliper.
   - If it exceeds the maximum diameter, install the new disc plate.

   **Maximum rear disc plate inner diameter**
   **191.0 mm {7.52 in}**

2. Install the disc plate and screw.
3. Perform the following steps to adjust the shoe clearance after installing the disc plate and the screws.
   (1) Insert a flathead screwdriver into the service hole and turn the adjuster in the direction of the arrow to expand the parking brake shoe until the disc plate cannot rotate.



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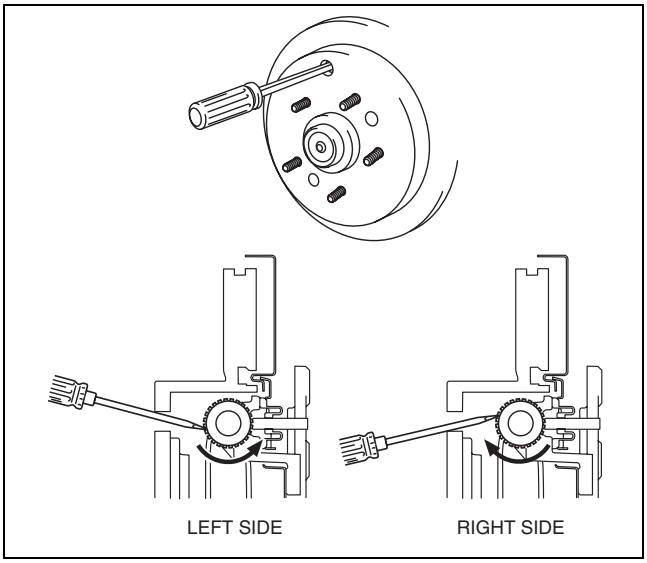


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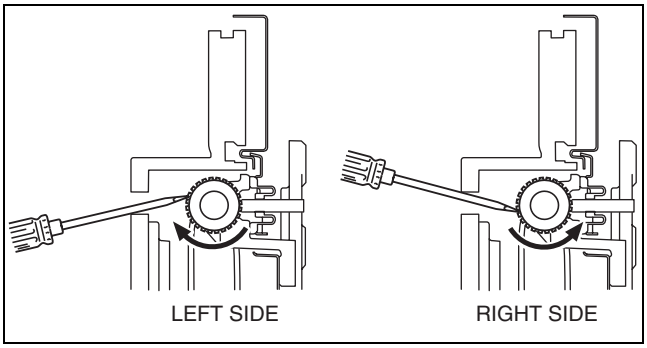
   (2) Return the adjuster **13—17 notches** in the direction of the arrow.

   **Note**
   - Shoe clearance can be adjusted to **0.15 mm {0.006 in}** by returning the adjuster **15 notches**.

   (3) Rotate the disc plate and make sure it does not drag.

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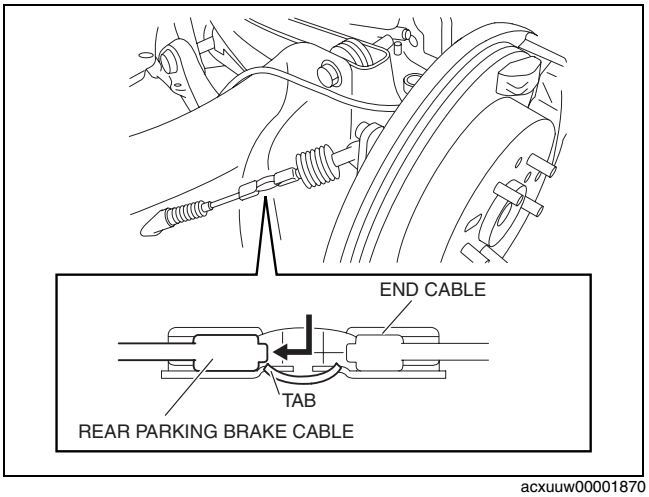
**End Cable Installation Note**

1. Move the rear parking brake cable end in the direction shown in the figure and install it to the end cable.
2. Verify that the end cable tab (rear parking brake cable side) is attached properly to the rear parking brake cable end.
3. Install the end cable to the operation lever.
4. Install the end cable installation bolts.

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## PARKING BRAKE REMOVAL/INSTALLATION[AWD]

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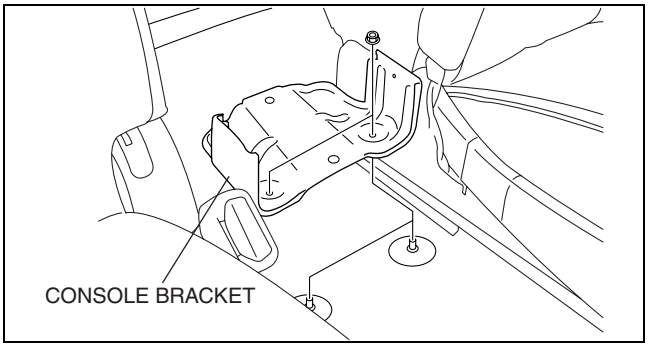
**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the harness if it is pulled by mistake. Before performing the following procedures, remove the ABS wheel-speed sensor (axle side) and fix it to an appropriate place where the sensor will not be pulled by mistake while servicing the vehicle.**

1. Perform the following procedure and remove the parking brake pedal.
   (1) Remove the lower panel. (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
2. Perform the following procedure and remove the front parking brake cable.
   (1) Remove the lower panel. (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (2) Remove the joint cover. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (3) Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Remove the console bracket as shown in the figure.
   (6) Turn the floor covering over until the front parking brake cable cover appears.

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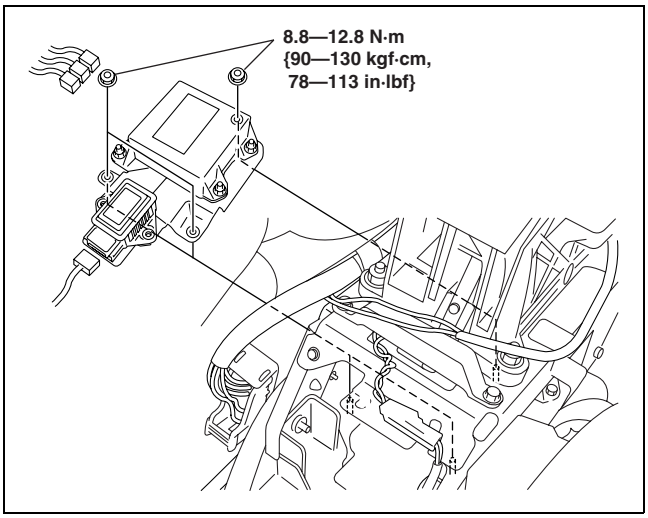
   (7) Disconnect the combined sensor connector and the SAS control module connector.
   (8) Remove the sensor bracket component as shown in the figure.
   (9) Remove the insulator.
3. Perform the following procedure and remove the rear parking brake cable.
   (1) Remove the insulator.
4. Perform the following procedure and remove the parking brake plate, back plate and wheel hub.
   (1) Remove the rear ABS wheel-speed sensor from the trailing link. (See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].)
   (2) Remove the middle pipe. (See 01-15-2 EXHAUST SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   (3) Remove the rear stabilizer. (See 02-14-11 REAR STABILIZER REMOVAL/INSTALLATION.)

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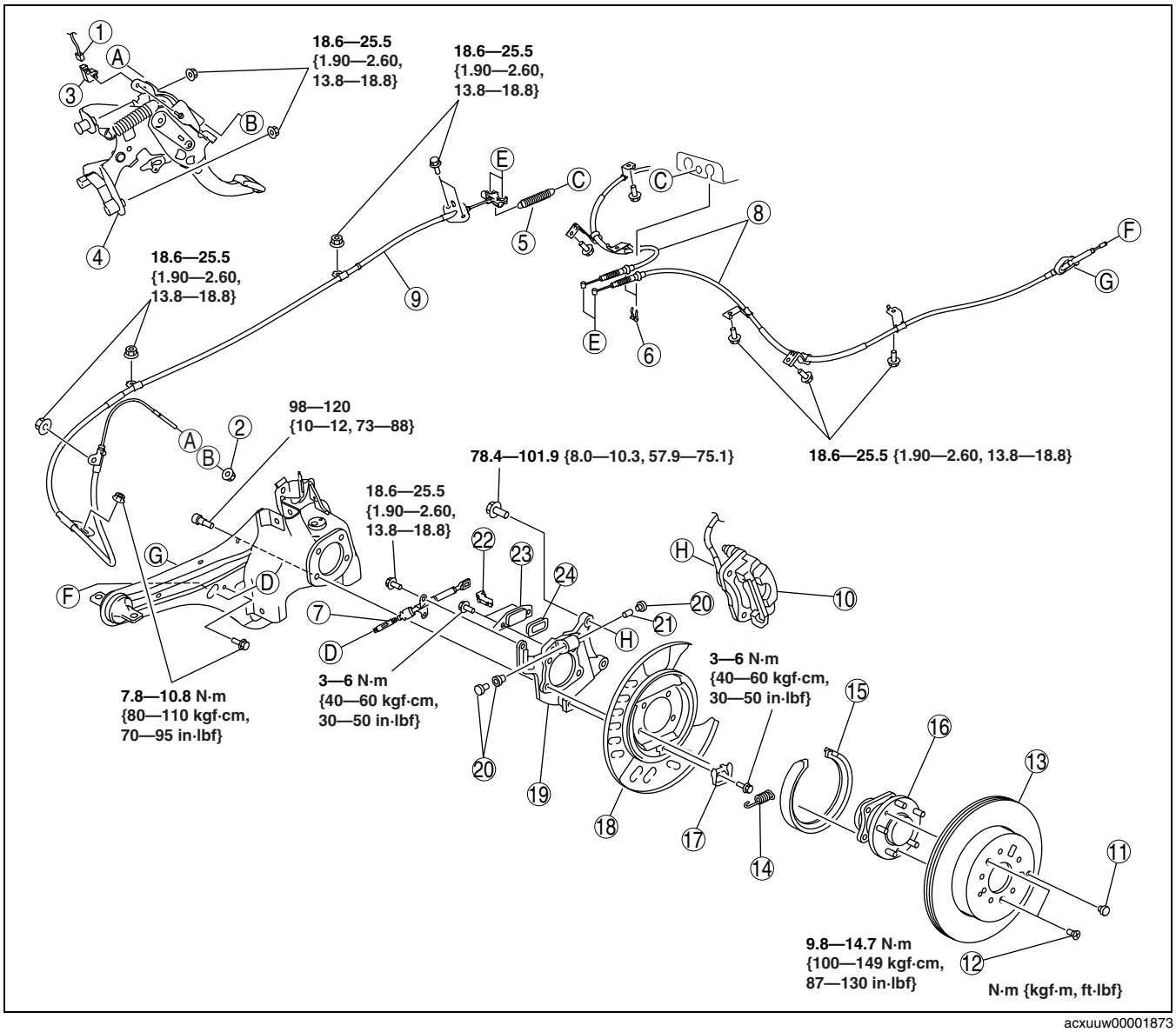
   (4) Remove the rear coil spring. (See 02-14-6 REAR COIL SPRING REMOVAL/INSTALLATION.)
   (5) Remove the trailing link component. (See 02-14-15 TRAILING LINK REMOVAL/INSTALLATION[AWD].)
5. Remove in the order indicated in the table.
6. Install in the reverse order of removal.
7. Adjust the parking brake stroke. (See 04-12-2 PARKING BRAKE ADJUSTMENT.)

8. Inspect the rear wheel alignment. (See 02-11-4 REAR WHEEL ALIGNMENT.)

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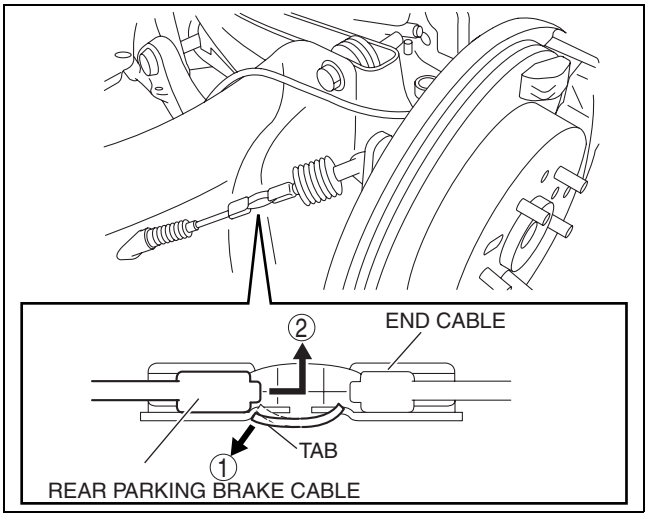
| | |
|---|---|
| 1 | Parking brake switch connector |
| 2 | Adjusting nut |
| 3 | Parking brake switch |
| 4 | Parking brake pedal |
| 5 | Spring |
| 6 | Clip |
| 7 | End cable<br>(See 04-12-10 End Cable Removal Note.)<br>(See 04-12-13 End Cable Installation Note.) |
| 8 | Rear parking brake cable |
| 9 | Front Parking brake cable, equalizer |
| 10 | Brake caliper component<br>(See 04-12-10 Brake Caliper Component Removal Note) |
| 11 | Plug |
| 12 | Screw<br>(See 04-12-12 Disc Plate, Screw Installation Note) |
| 13 | Disc plate<br>(See 04-12-10 Disc Plate Removal Note)<br>(See 04-12-12 Disc Plate, Screw Installation Note) |

| | |
|---|---|
| 14 | Spring |
| 15 | Parking brake shoe<br>(See 04-12-11 Parking Brake Shoe Removal Note)<br>(See 04-12-11 Parking Brake Shoe Installation Note) |
| 16 | Rear wheel hub component |
| 17 | Shoe stopper |
| 18 | Backing plate |
| 19 | Parking brake plate |
| 20 | Adjuster bolt and nut, tappet<br>(See 04-12-11 Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note) |
| 21 | Pin<br>(See 04-12-11 Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note.) |
| 22 | Operation lever<br>(See 04-12-11 Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note.) |
| 23 | Plate |
| 24 | Dust boot |

**End Cable Removal Note**

1. Remove the end cable installation bolts.
2. Disconnect the end cable from the operation lever.
3. Bend the end cable tab (rear parking brake cable side) in the direction shown in the figure.
4. Move the rear parking brake cable end in the direction shown in the figure and disconnect it from the end cable.
5. Remove the end cable.

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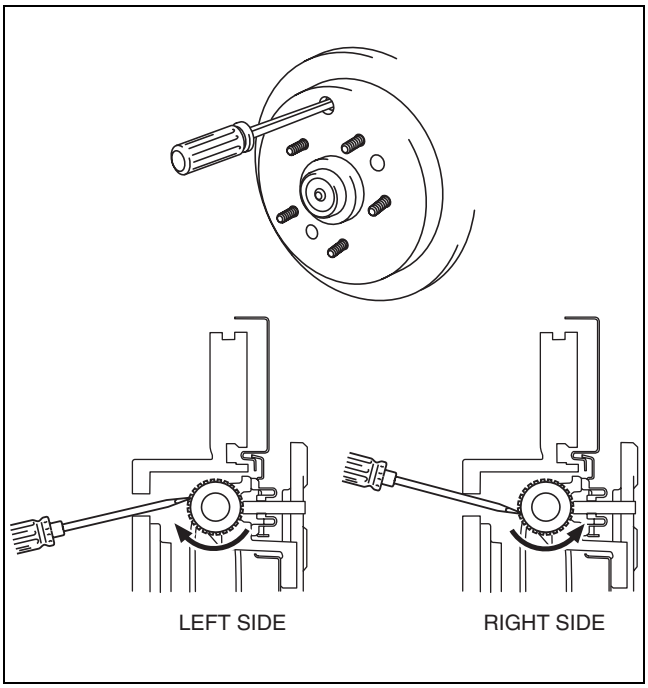
**Brake Caliper Component Removal Note**

1. Remove the brake caliper assembly from the trailing link and suspend it with a cable so it does not interfere.

**Disc Plate Removal Note**

1. If any disc plate is difficult to remove, perform the following steps to remove it.
   (1) Insert a flathead screwdriver into the service hole and turn the adjuster in the direction of the arrow to compress the parking brake shoe.
   (2) Remove the disc plate.

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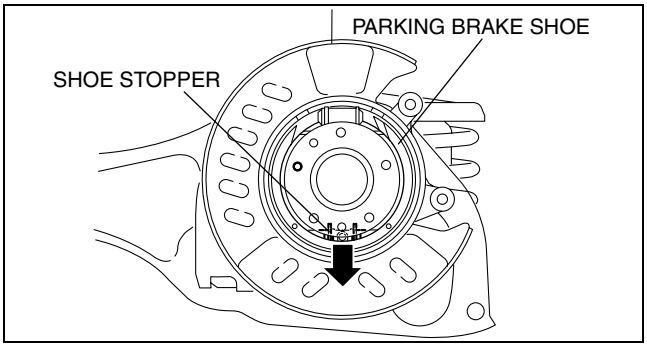
**Parking Brake Shoe Removal Note**

1. Pull the parking brake shoe downward and disengage it from the shoe stopper.
2. Press the adjuster bolt and tappet by hand, and slowly remove the parking brake shoe.

**Note**

- When removing the parking brake shoe, firmly press the adjuster bolt and tappet by hand and slowly remove the parking brake shoe to prevent the adjuster bolt, tappet, operation lever and other parts from flying off.

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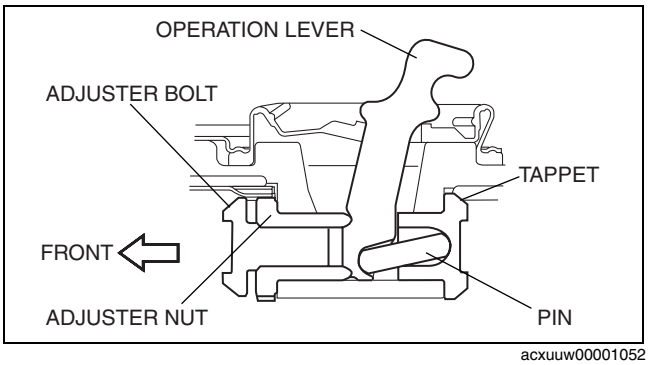
**Operation lever, Pin, Adjuster Bolt and Nut, Tappet Installation Note**

1. Install the operation lever, pin, adjuster bolt and nut, and tappet so that the adjuster nut is facing toward the vehicle front.
2. Completely tighten the adjuster bolt and nut.
3. Move the operation lever by hand and verify that it operates properly.
   - If proper operation cannot be verified, reinstall.

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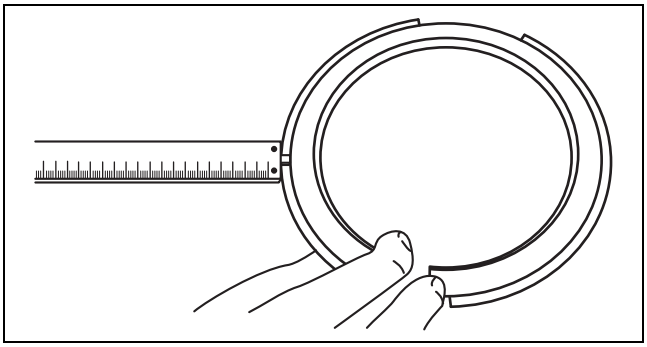
**Parking Brake Shoe Installation Note**

1. Measure the parking brake lining thickness with a vernier caliper or measuring scale.
   - If it is less than the minimum thickness, install a new parking brake shoe.

**Minimum parking brake shoe thickness**
**1.0 mm {0.04 in}**



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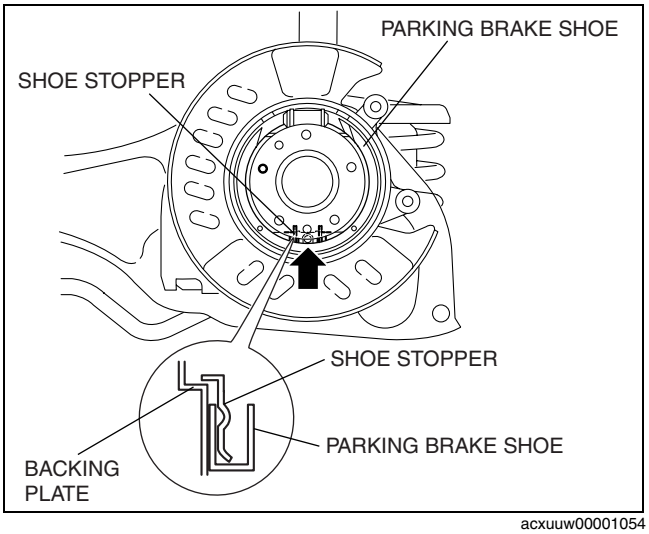
2. After installing the opening of the parking brake shoe to the adjuster bolt and tappet, push the brake shoe upward and attach it to the shoe stopper.

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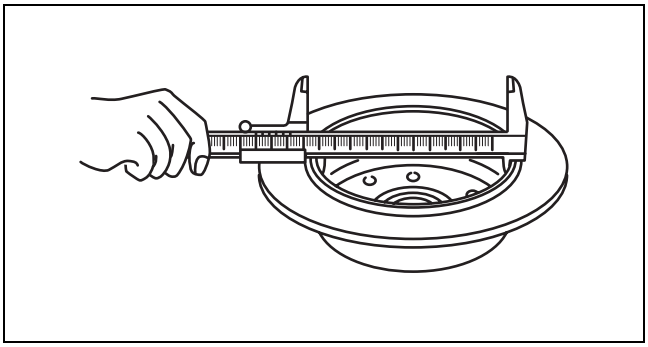
**Disc Plate, Screw Installation Note**

1. Measure the inner diameter of the disc plate with a vernier caliper.
   - If it exceeds the maximum diameter, install the new disc plate.

   **Maximum rear disc plate inner diameter**
   **191.0 mm {7.52 in}**



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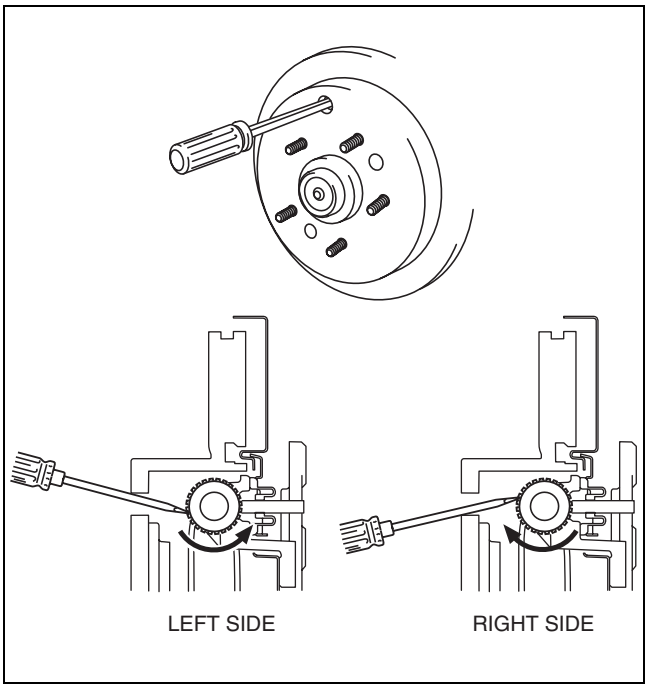
2. Install the disc plate and screw.
3. Perform the following steps to adjust the shoe clearance after installing the disc plate and the screws.

   (1) Insert a flathead screwdriver into the service hole and turn the adjuster in the direction of the arrow to expand the parking brake shoe until the disc plate cannot rotate.

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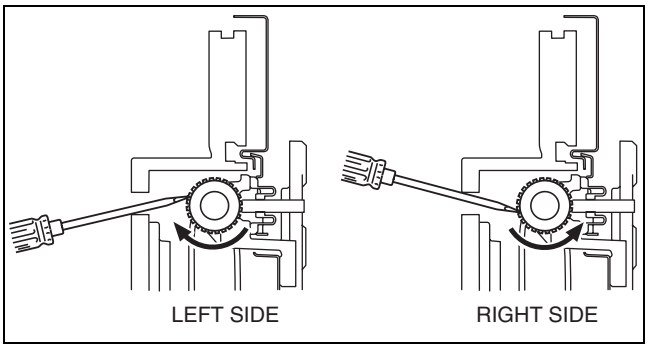
   (2) Return the adjuster **13—17 notches** in the direction of the arrow.

   **Note**
   - Shoe clearance can be adjusted to **0.15 mm {0.006 in}** by returning the adjuster **15 notches**.

   (3) Rotate the disc plate and make sure it does not drag.

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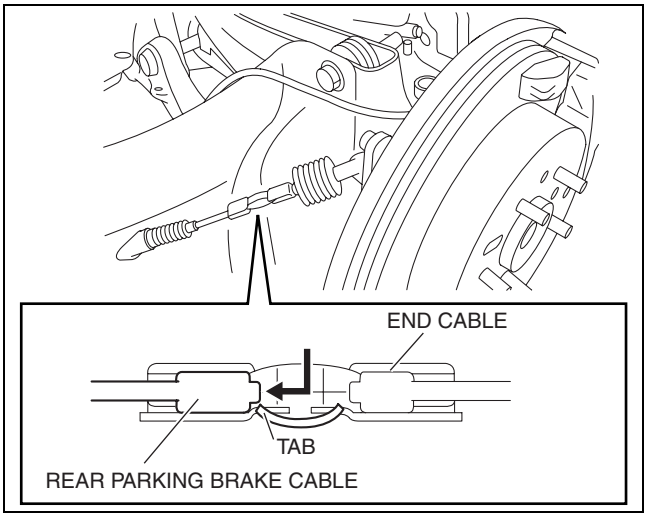
**End Cable Installation Note**

1. Move the rear parking brake cable end in the direction shown in the figure and install it to the end cable.
2. Verify that the end cable tab (rear parking brake cable side) is attached properly to the rear parking brake cable end.
3. Install the end cable to the operation lever.
4. Install the end cable installation bolts.

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**PARKING BRAKE SWITCH INSPECTION**

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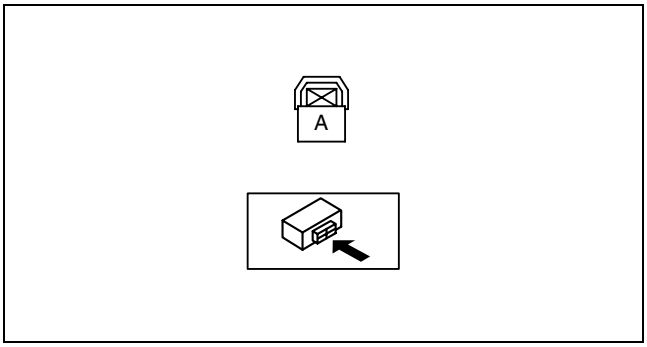
1. Disconnect the parking brake switch connector.
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the parking brake switch.

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○—○: Continuity

| Condition | Terminal | |
|---|---|---|
| | **A** | Body ground |
| Parking brake pedal depressed | ○——○ | |
| Parking brake pedal released | | |

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# 04-15 DYNAMIC STABILITY CONTROL


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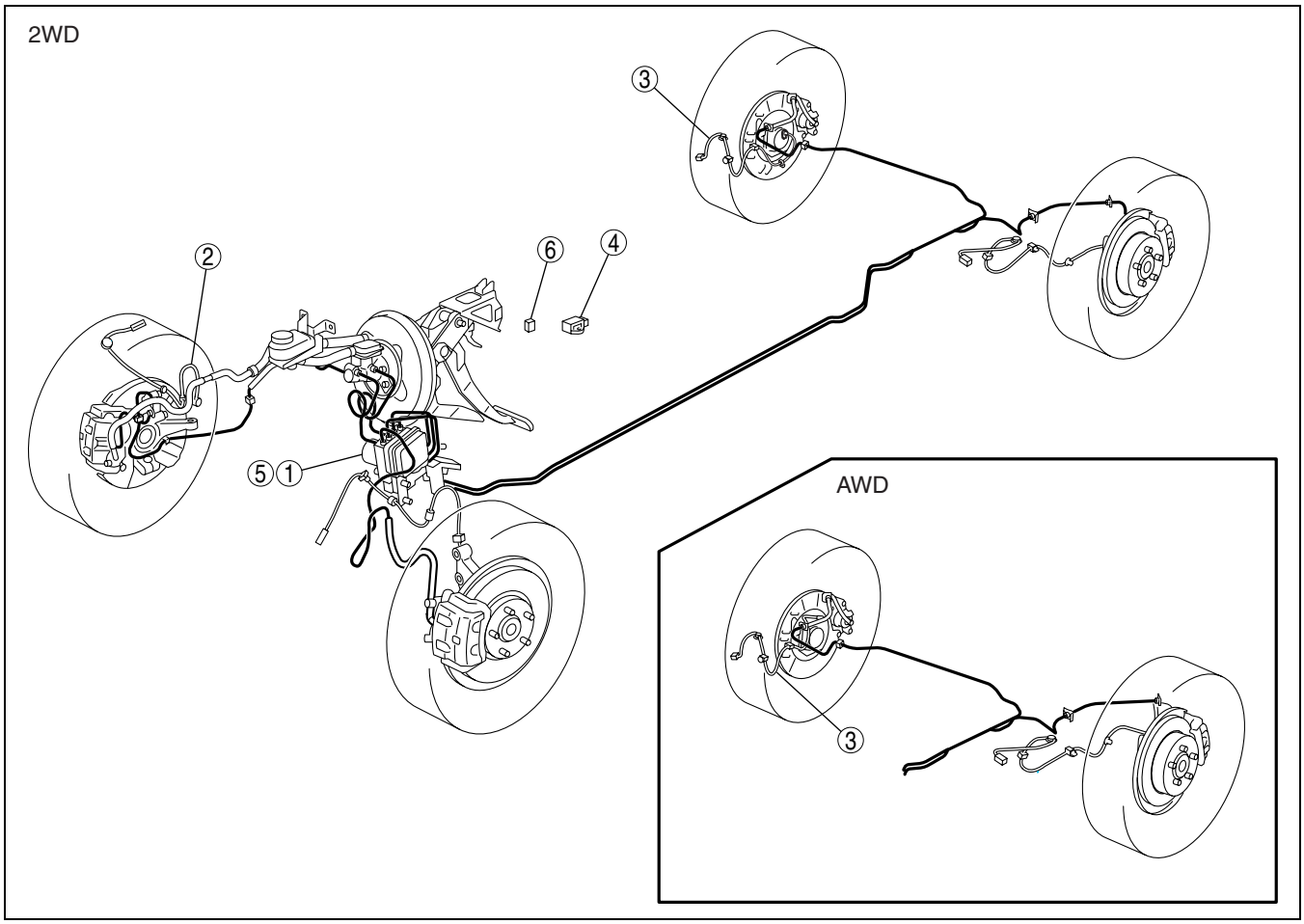


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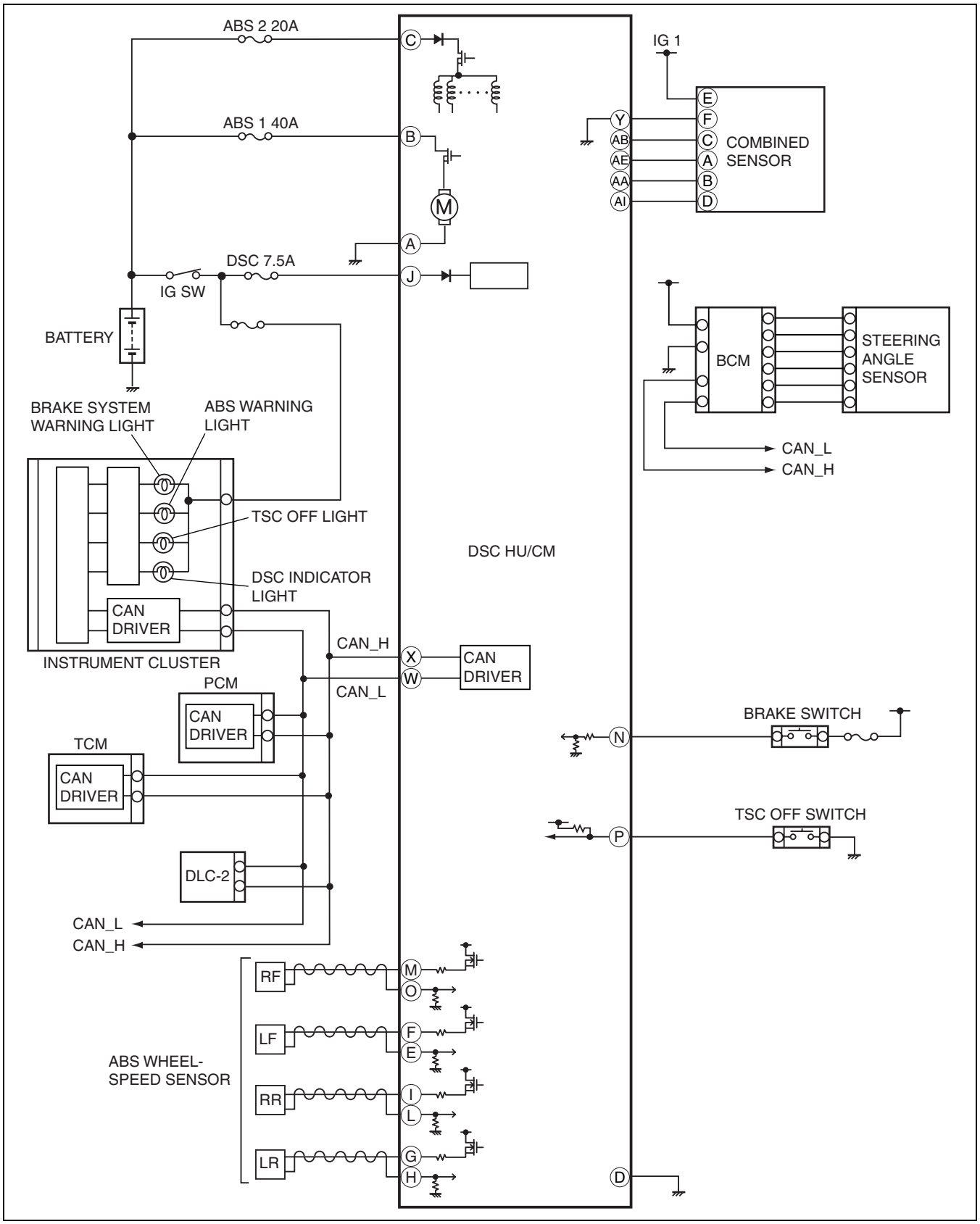
| | |
|---|---|
| 1 | DSC HU/CM<br>(See 04-15-3 DSC SYSTEM WIRING DIAGRAM.)<br>(See 04-15-4 DSC SYSTEM INSPECTION.)<br>(See 04-15-6 DSC HU/CM REMOVAL/ INSTALLATION.)<br>(See 04-15-9 DSC HU/CM INSPECTION.) |
| 2 | Front ABS wheel-speed sensor<br>(See 04-15-11 FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION.)<br>(See 04-15-12 FRONT ABS WHEEL-SPEED SENSOR INSPECTION.) |
| 3 | Rear ABS wheel-speed sensor<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD].)<br>(See 04-15-13 REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD].)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD].)<br>(See 04-15-14 REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD].) |

| | |
|---|---|
| 4 | Combined sensor<br>(See 04-15-15 COMBINED SENSOR REMOVAL/ INSTALLATION.)<br>(See 04-15-16 COMBINED SENSOR INSPECTION.)<br>(See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.) |
| 5 | Brake fluid pressure sensor (built-into DSC HU/CM)<br>(See 04-15-17 BRAKE FLUID PRESSURE SENSOR INSPECTION.) |
| 6 | TCS OFF switch<br>(See 04-15-18 TCS OFF SWITCH REMOVAL/ INSTALLATION.)<br>(See 04-15-18 TCS OFF SWITCH INSPECTION.) |

## DSC SYSTEM WIRING DIAGRAM

id041500800600

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## DSC SYSTEM INSPECTION

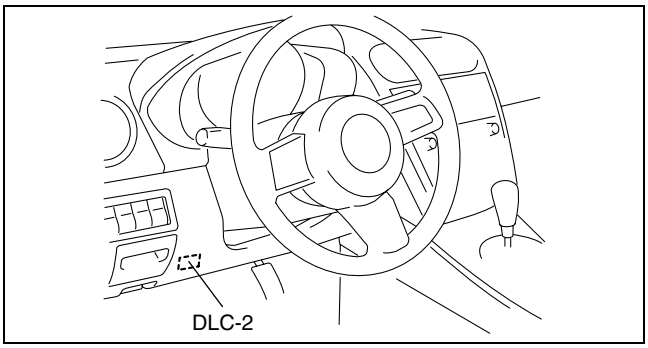
id041500800700

### Preparation

1. Verify that battery is fully charged.
2. Turn the ignition switch to the ON position, and verify that the ABS warning light goes out after **approx. 3 s.**
3. Turn the ignition switch off.
4. Jack up the vehicle and support it evenly on safety stands.
5. Shift to the N position.
6. Verify that all four wheels rotate.
7. Rotate the inspected wheels by hand, and verify there is no brake drag.
   - If there is any brake drag, perform regular brake inspection.
   - If there is no brake drag, perform DSC HU/CM operation inspection.

### ABS Control Inspection

1. Perform “Preparation”.
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

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**Brake pressure retention**

<table>
<tr><th rowspan="2">Command name</th><th colspan="4">Inspected wheels</th></tr>
<tr><th>LF</th><th>RF</th><th>LR</th><th>RR</th></tr>
<tr><td>V_TRC_L</td><td colspan="4" rowspan="4">OFF</td></tr>
<tr><td>V_TRC_R</td></tr>
<tr><td>V_STB_L</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td>ON</td><td rowspan="3">OFF</td><td>OFF</td><td rowspan="4">OFF</td></tr>
<tr><td>LF_OUTLET</td><td rowspan="6">OFF</td><td>ON</td></tr>
<tr><td>LR_INLET</td><td rowspan="5">OFF</td></tr>
<tr><td>LR_OUTLET</td><td rowspan="2">ON</td></tr>
<tr><td>RF_INLET</td></tr>
<tr><td>RF_OUTLET</td><td rowspan="3">OFF</td><td rowspan="4">OFF</td></tr>
<tr><td>RR_INLET</td><td rowspan="2">OFF</td><td>ON</td></tr>
<tr><td>RR_OUTLET</td><td rowspan="2">OFF</td></tr>
<tr><td>PMP_MOTOR</td></tr>
</table>

**Brake pressure reduction**

<table>
<tr><th rowspan="2">Command name</th><th colspan="4">Inspected wheels</th></tr>
<tr><th>LF</th><th>RF</th><th>LR</th><th>RR</th></tr>
<tr><td>V_TRC_L</td><td colspan="4" rowspan="4">OFF</td></tr>
<tr><td>V_TRC_R</td></tr>
<tr><td>V_STB_L</td></tr>
<tr><td>V_STB_R</td></tr>
<tr><td>LF_INLET</td><td rowspan="2">ON</td><td rowspan="3">OFF</td><td>OFF</td><td rowspan="4">OFF</td></tr>
<tr><td>LF_OUTLET</td><td rowspan="5">OFF</td></tr>
<tr><td>LR_INLET</td><td>ON</td></tr>
<tr><td>LR_OUTLET</td><td rowspan="3">OFF</td></tr>
<tr><td>RF_INLET</td><td>ON</td><td rowspan="3">OFF</td></tr>
<tr><td>RF_OUTLET</td><td rowspan="2">OFF</td><td rowspan="2">ON</td></tr>
<tr><td>RR_INLET</td></tr>
<tr><td>RR_OUTLET</td><td colspan="3">ON</td></tr>
<tr><td>PMP_MOTOR</td></tr>
</table>

**Caution**

- **To protect the DSC HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

**Note**

- When working with two people, one should press on the brake pedal, and the other should attempt to rotate the wheel being inspected.

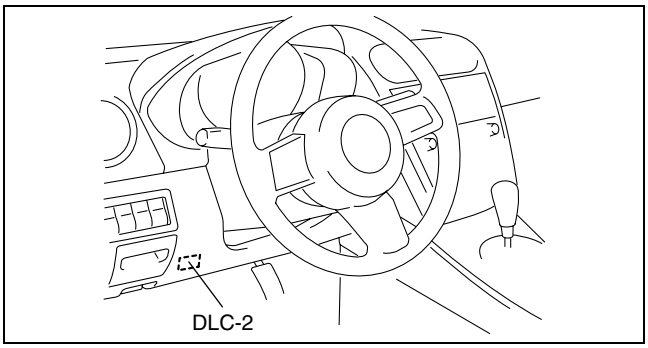
4. Send the command while depressing on the brake pedal and attempting to rotate the wheel being inspected.
5. While brake pressure is maintained and a DSC HU/CM operation click sound is heard, confirm that the wheel does not rotate. While brake pressure is being reduced and an DSC HU/CM operation click sound is heard, confirm that the wheel rotates.
   - Performing the inspection above determines the following:
     — The DSC HU/CM brake lines are normal.
     — The DSC HU/CM hydraulic system is not significantly abnormal (including DSC HU/CM).
     — The DSC HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
     — The DSC unit and DSC HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
   - However, the following items cannot be verified.
     — Malfunction with intermittent occurrence of the above items
     — Malfunction of DSC HU/CM input system wiring harnesses and parts
     — Extremely small leaks in the DSC HU/CM internal hydraulic system

**DSC Control Inspection**

1. Perform “Preparation”.
2. Connect the M-MDS to the DLC-2.
3. Set up an active command mode inspection according to the combination of commands below.

**Caution**

- **To protect the DSC HU/CM, the solenoid valve and the pump motor used during active command mode stay on for only 10 s or less each time they are switched on.**

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| Command name | Inspected wheels | | | |
|---|---|---|---|---|
| | Understeer control inhibited | | Oversteer control inhibited | |
| | LF | RF | LR | RR |
| V_TRC_L | ON | OFF | | ON |
| V_TRC_R | OFF | ON | | OFF |
| V_STB_L | OFF | | | |
| V_STB_R | | | | |
| LF_INLET | OFF | OFF | OFF | ON |
| LF_OUTLET | | | | OFF |
| LR_INLET | | ON | | |
| LR_OUTLET | | OFF | | |
| RF_INLET | | | ON | |
| RF_OUTLET | | | OFF | |
| RR_INLET | ON | | | |
| RR_OUTLET | OFF | | | |
| PMP_MOTOR | ON | | | |

4. Send the command while rotating the wheel being inspected by hand in a forward direction.
5. Confirm that the wheel does not rotate easily while a DSC HU/CM operation click sound is heard.
   - Performing the inspection above determines the following:
     — The DSC HU/CM brake lines are normal.
     — The DSC HU/CM hydraulic system is not significantly abnormal (including DSC HU/CM).
     — The DSC HU/CM internal electrical parts (solenoid, motor and other parts) are normal.
     — The DSC unit and DSC HU/CM output system wiring harnesses (solenoid valve, relay system) are normal.
   - However, the following items cannot be verified.
     — Malfunction with intermittent occurrence of the above items
     — Malfunction of DSC HU/CM input system wiring harnesses and parts
     — Extremely small leaks in the DSC HU/CM internal hydraulic system

**DSC HU/CM REMOVAL/INSTALLATION**

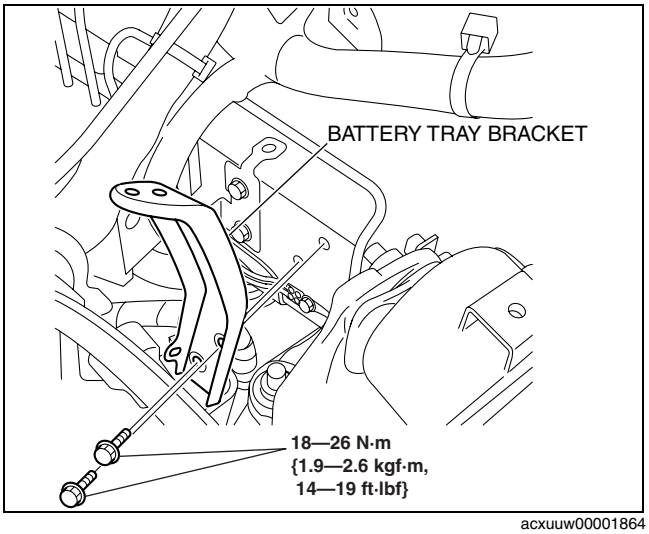
id041500801000

**Caution**

- **The DSC may not function normally when the DSC HU/CM is replaced. After installation, always perform the initialization procedures for the DSC HU/CM, combined sensor and the steering angle sensor. (See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.) (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)**
- **The internal parts of the DSC HU/CM could be damaged if dropped. Be careful not to drop the DSC HU/CM. Replace the DSC HU/CM if it is subjected to an impact.**

1. Remove the battery and battery tray. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)

2. Remove the battery tray bracket as shown in the figure.
3. Remove in the order indicated in the table.
4. Install in the reverse order of removal.
5. After installation, add brake fluid, bleed the air, and inspect for fluid leakage. (See 04-11-3 AIR BLEEDING.)
6. After installation, perform the combined sensor initialization procedure. (See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.)
7. After installation, perform the steering angle sensor initialization procedure. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)

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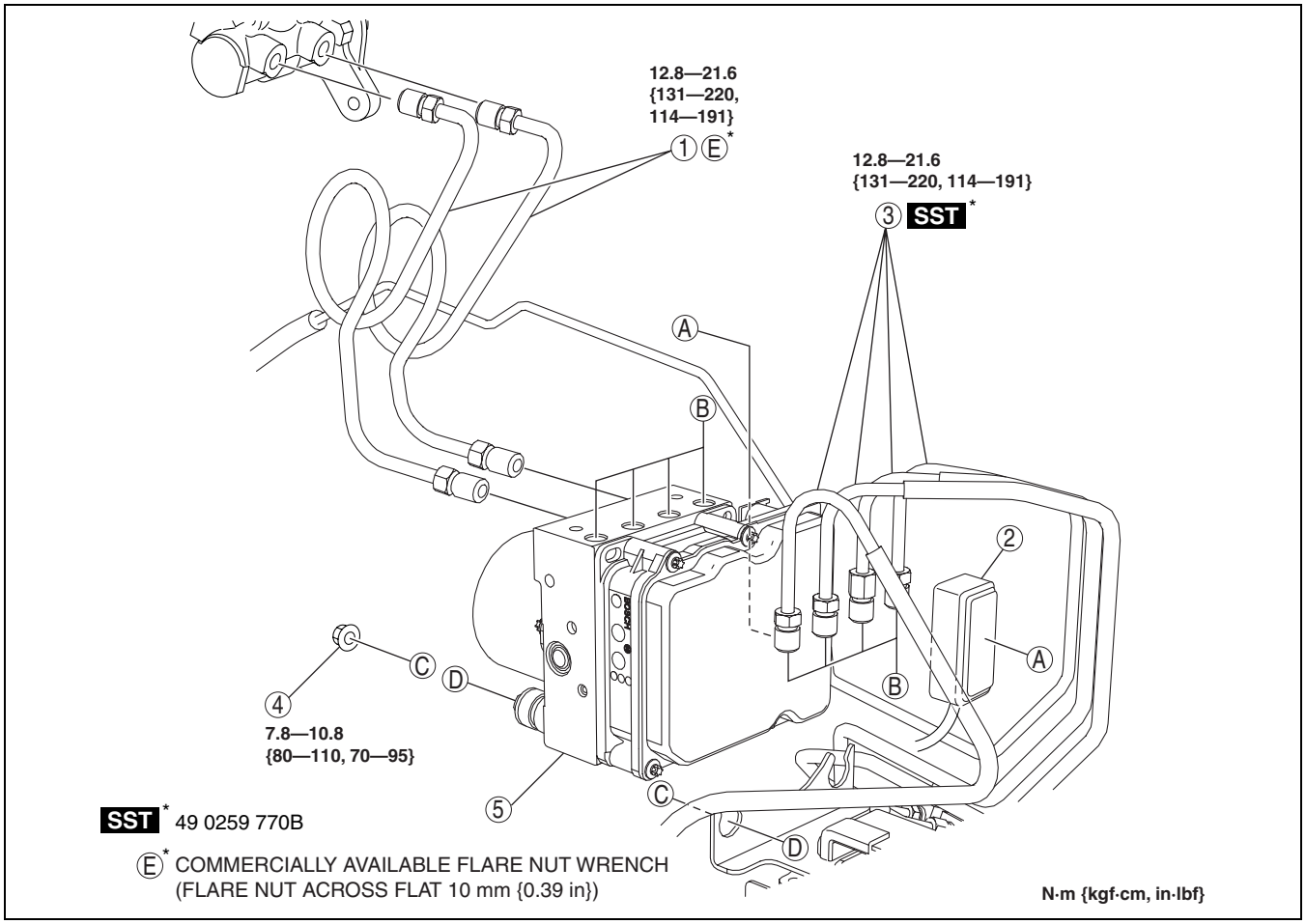


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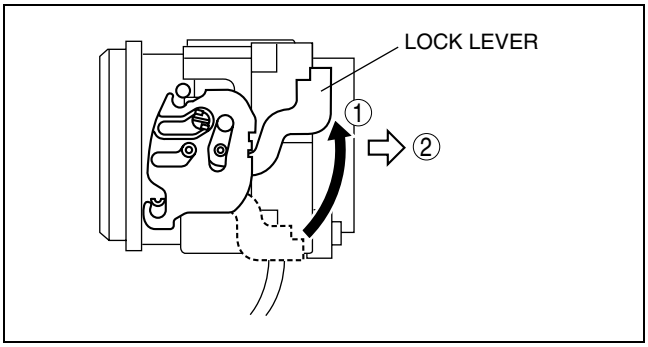
| | |
|---|---|
| 1 | Brake pipe (DSC HU/CM— master cylinder) |
| 2 | DSC HU/CM connector<br>(See 04-15-8 DSC HU/CM Connector Removal Note.)<br>(See 04-15-9 DSC HU/CM Connector Installation Note.) |

| | |
|---|---|
| 3 | Brake pipe<br>(See 04-15-8 Brake Pipe Removal Note.)<br>(See 04-15-8 Brake Pipe Installation Note.) |
| 4 | Nut |
| 5 | DSC HU/CM<br>(See 04-15-8 DSC HU/CM Installation Note.) |

**DSC HU/CM Connector Removal Note**

1. Pull the lock lever up in the direction of the arrow.
2. Pull the connector toward the vehicle rear and remove it.

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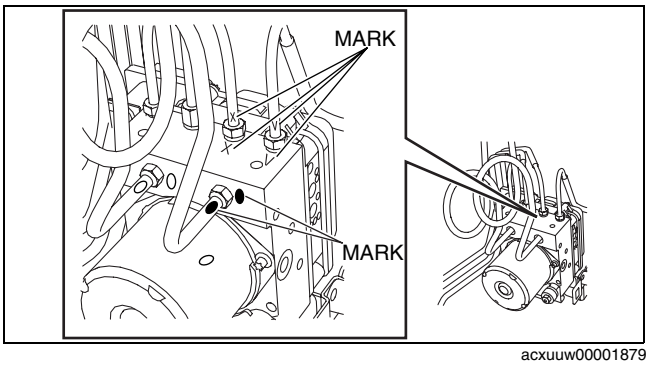
**Brake Pipe Removal Note**

1. Place an alignment mark on the brake pipe and DSC HU/CM.
2. Apply protective tape to the connector to prevent brake fluid from entering.
3. Remove the brake pipe.

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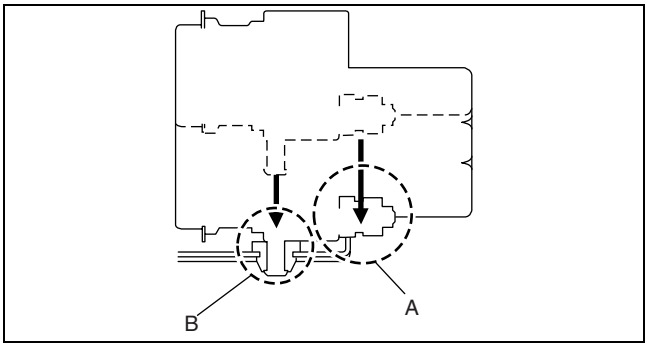
**DSC HU/CM Installation Note**

1. Install the rubber mount on DSC HU/CM section A to the bracket as shown in the figure.
2. Install DSC HU/CM section B to the bracket.
3. Install the nuts to DSC HU/CM section A and tighten them.

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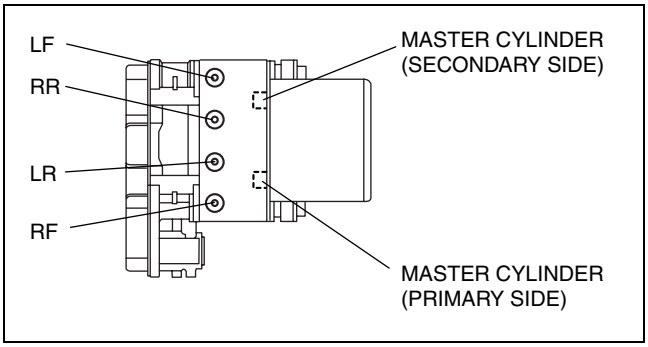
**Brake Pipe Installation Note**

1. Align the marks made before removal and install the brake pipe to the DSC HU/CM and brake pipe joint referring to the figure.
2. Tighten the brake pipe to the specified torque using the **SST** (49 0259 770B) and the commercially available flare nut wrench.

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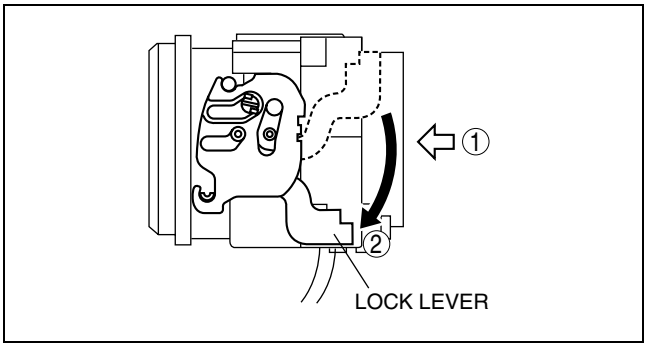
**DSC HU/CM Connector Installation Note**

1. After connecting the connector, verify that the lock lever is completely pushed in.

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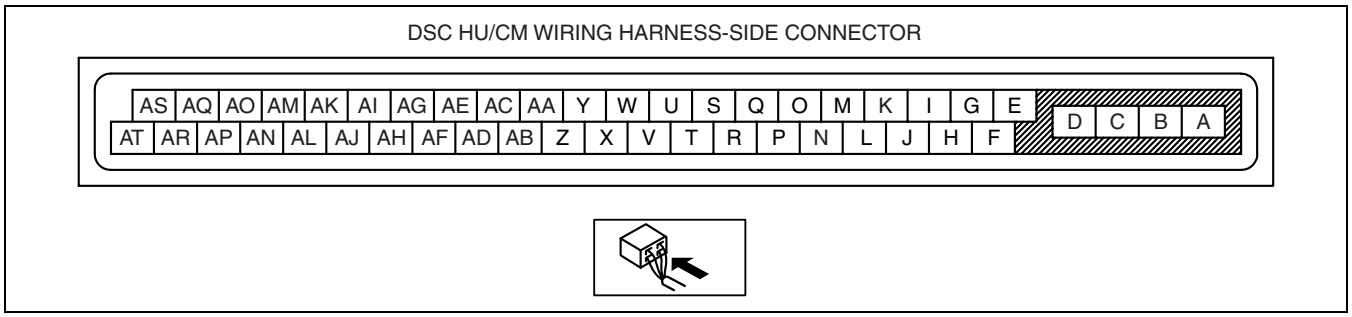
**DSC HU/CM INSPECTION**

id041500801100



1. Disconnect the DSC HU/CM connector. (See 04-15-6 DSC HU/CM REMOVAL/INSTALLATION.)
2. Connect the negative battery cable. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
3. Attach the tester lead to the DSC HU/CM harness side connector, then inspect voltage, continuity or resistance according to the standard (reference value) on the table.

**Standard (Reference Value)**

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| Terminal | Signal name | Connected to | Measured item | Measured terminal (measured condition) | Standard | Inspection item(s) |
|---|---|---|---|---|---|---|
| A | Ground (ABS motor) | Ground point | Continuity | A— ground point | Continuity detected | • Wiring harness (A— ground point) |
| B | Power supply (ABS motor operation) | Battery | Voltage | Under any condition | B+ | • Wiring harness (B— battery) |
| C | Power supply (solenoid operation) | Battery | Voltage | Under any condition | B+ | • Wiring harness (C— battery) |
| D | Ground (DSC system) | Ground point | Continuity | D— ground point | Continuity detected | • Wiring harness (D— ground point) |
| E | LF wheel-speed sensor (signal) | LF ABS wheel-speed sensor | Continuity | E— LF ABS wheel-speed sensor connector terminal B | Continuity detected | • Wiring harness (E— LF ABS wheel-speed sensor connector terminal B) |
| F | LF wheel-speed sensor (power supply) | LF ABS wheel-speed sensor | Continuity | F— LF ABS wheel-speed sensor connector terminal A | Continuity detected | • Wiring harness (F— LF ABS wheel-speed sensor connector terminal A) |
| G | LR wheel-speed sensor (power supply) | LR ABS wheel-speed sensor | Continuity | G— LR ABS wheel-speed sensor connector terminal B | Continuity detected | • Wiring harness (G— LR ABS wheel-speed sensor connector terminal B) |
| H | LR wheel-speed sensor (signal) | LR ABS wheel-speed sensor | Continuity | H— LR ABS wheel-speed sensor connector terminal A | Continuity detected | • Wiring harness (H— LR ABS wheel-speed sensor connector terminal A) |

| Terminal | Signal name | Connected to | Measured item | Measured terminal (measured condition) | Standard | Inspection item(s) |
|---|---|---|---|---|---|---|
| I | RR wheel-speed sensor (power supply) | RR ABS wheel-speed sensor | Continuity | I— RR ABS wheel-speed sensor connector terminal B | Continuity detected | • Wiring harness (I— RR ABS wheel-speed sensor connector terminal B) |
| J | Power supply (system) | Ignition switch | Voltage | Ignition switch at ON | B+ | • Wiring harness (J— ignition switch) |
| | | | | Ignition switch is off. | 1 V or less | — |
| K | — | — | — | — | — | — |
| L | RR wheel-speed sensor (signal) | RR ABS wheel-speed sensor | Continuity | L— RR ABS wheel-speed sensor connector terminal A | Continuity detected | • Wiring harness (L— RR ABS wheel-speed sensor connector terminal A) |
| M | RF wheel-speed sensor (power supply) | RF ABS wheel-speed sensor | Continuity | M— RF ABS wheel-speed sensor connector terminal A | Continuity detected | • Wiring harness (M— RF ABS wheel-speed sensor connector terminal A) |
| N | Brake switch | Brake switch | Voltage | N— ground point (Brake pedal depressed) | B+ | • Wiring harness (N— brake switch)<br>• Brake switch |
| | | | | N— ground point (Brake pedal not depressed) | 1 V or less | — |
| O | RF wheel-speed sensor (signal) | RF ABS wheel-speed sensor | Continuity | O— RF ABS wheel-speed sensor connector terminal B | Continuity detected | • Wiring harness (O— RF ABS wheel-speed sensor connector terminal B) |
| P | TCS OFF switch | TCS OFF switch | Continuity | P— TCS OFF switch connector terminal A | Continuity detected | • Wiring harness (P— TCS OFF switch connector terminal A) |
| Q | — | — | — | — | — | — |
| R | — | — | — | — | — | — |
| S | — | — | — | — | — | — |
| T | — | — | — | — | — | — |
| U | — | — | — | — | — | — |
| V | — | — | — | — | — | — |
| W | CAN_L | DLC-2 (CAN_L) | Continuity | W— DLC-2 terminal CAN_L | Continuity detected | • Wiring harness (W— DLC-2 terminal CAN_L) |
| X | CAN_H | DLC-2 (CAN_H) | Continuity | X— DLC-2 terminal CAN_H | Continuity detected | • Wiring harness (X— DLC-2 terminal CAN_H) |
| Y | Ground (combined sensor) | Combined sensor | Continuity | Y— combined sensor connector terminal F | Continuity detected | • Wiring harness (Y— combined sensor connector terminal F) |
| Z | — | — | — | — | — | — |
| AA | Yaw rate (signal) | Combined sensor | Continuity | AA— combined sensor connector terminal B | Continuity detected | • Wiring harness (AA— combined sensor connector terminal B) |
| AB | Yaw rate (test signal) | Combined sensor | Continuity | AB— combined sensor connector terminal C | Continuity detected | • Wiring harness (AB— combined sensor connector terminal C) |
| AC | — | — | — | — | — | — |
| AD | — | — | — | — | — | — |
| AE | Yaw rate (reference signal) | Combined sensor | Continuity | AE— combined sensor connector terminal A | Continuity detected | • Wiring harness (AE— combined sensor connector terminal A) |
| AF | — | — | — | — | — | — |
| AG | — | — | — | — | — | — |
| AH | — | — | — | — | — | — |
| AI | Lateral-G (signal) | Combined sensor | Continuity | AI— combined sensor connector terminal D | Continuity detected | • Wiring harness (AI— combined sensor connector terminal D) |

| Terminal | Signal name | Connected to | Measured item | Measured terminal (measured condition) | Standard | Inspection item(s) |
|---|---|---|---|---|---|---|
| AJ | — | — | — | — | — | — |
| AK | — | — | — | — | — | — |
| AL | — | — | — | — | — | — |
| AM | — | — | — | — | — | — |
| AN | — | — | — | — | — | — |
| AO | — | — | — | — | — | — |
| AP | — | — | — | — | — | — |
| AQ | — | — | — | — | — | — |
| AR | — | — | — | — | — | — |
| AS | — | — | — | — | — | — |
| AT | — | — | — | — | — | — |



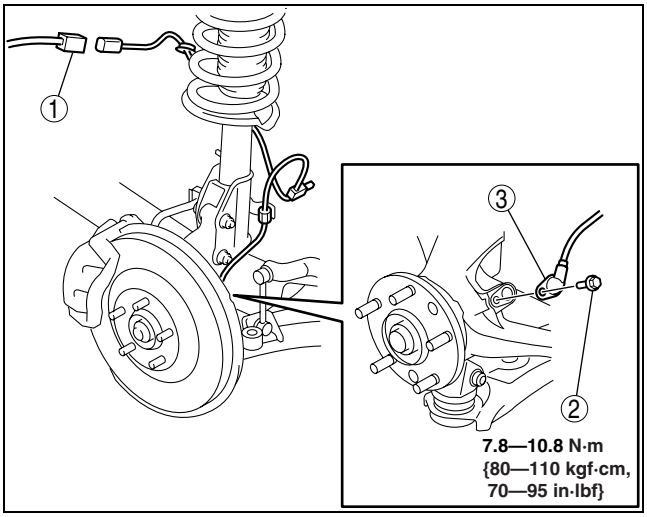
### FRONT ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION

id041500800300

1. Perform the following procedure and remove the LF ABS wheel-speed sensor.
   (1) Remove the battery and battery tray.
   (2) Remove the air cleaner component and air hose. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Front ABS wheel-speed sensor connector |
| 2 | Bolt |
| 3 | Front ABS wheel-speed sensor |

3. Install in the reverse order of removal.

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## FRONT ABS WHEEL-SPEED SENSOR INSPECTION

id041500800400

### Installation Visual Inspection

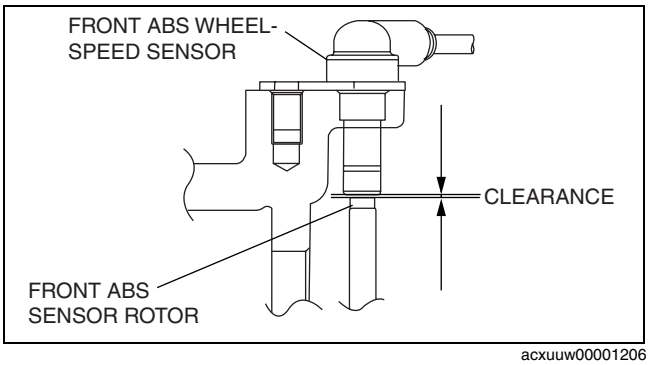
1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   (1) Excessive play of the ABS wheel-speed sensor
   (2) Deformation of the ABS wheel-speed sensor
   (3) Deformation or damage of the ABS sensor rotor

### Clearance Inspection

1. Verify the clearance between the ABS sensor rotor and the ABS wheel-speed sensor.
   - If there is any malfunction, check for improper installation, and replace if necessary.

**Clearance**

- **0.7— 1.5 mm {0.028— 0.059 in}**

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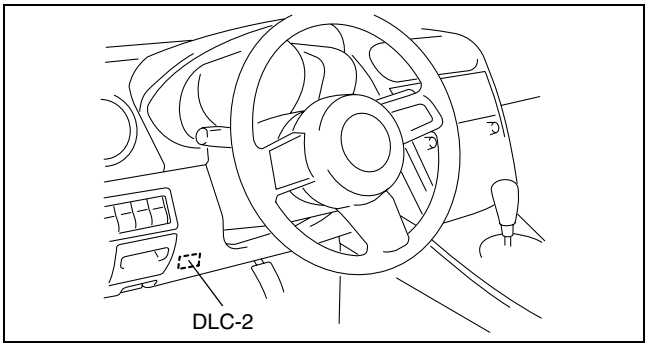
### Sensor Output Value Inspection

1. Turn the ignition switch off.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs using the M-MDS:
   - WSPD_LF
     (LF ABS wheel-speed sensor)
   - WSPD_RF
     (RF ABS wheel-speed sensor)
4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS shows the same value as the speedometer.
   - If there is any malfunction, replace the front ABS wheel-speed sensor.

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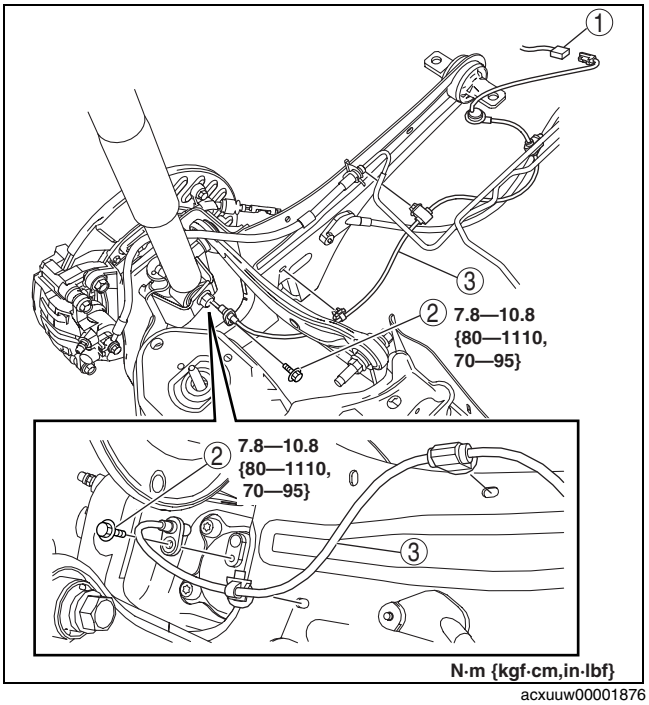
### REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[2WD]

id0415008001a1

1. Remove the rear seat. (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
2. Rear scuff plate inner. (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
3. Remove the sub trunk box. (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
4. Remove the trunk end trim. (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
5. Remove the trunk side trim. (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Rear ABS wheel-speed sensor connector |
| 2 | Bolt |
| 3 | Rear ABS wheel-speed sensor |

7. Install in the reverse order of removal.

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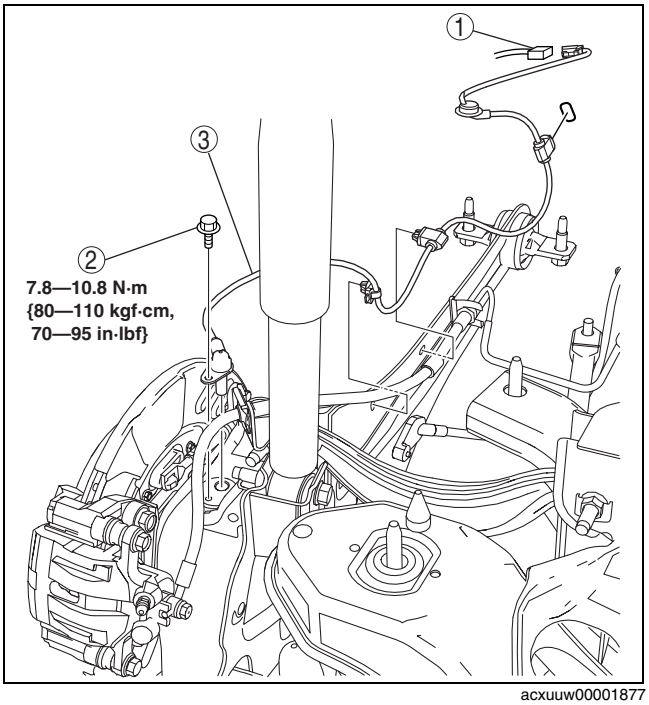
### REAR ABS WHEEL-SPEED SENSOR REMOVAL/INSTALLATION[AWD]

id0415008001a7

1. Remove the rear seat. (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
2. Rear scuff plate inner. (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
3. Remove the sub trunk box. (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
4. Remove the trunk end trim. (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
5. Remove the trunk side trim. (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Rear ABS wheel-speed sensor connector |
| 2 | Bolt |
| 3 | Rear ABS wheel-speed sensor |

7. Install in the reverse order of removal.

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## REAR ABS WHEEL-SPEED SENSOR INSPECTION[2WD]

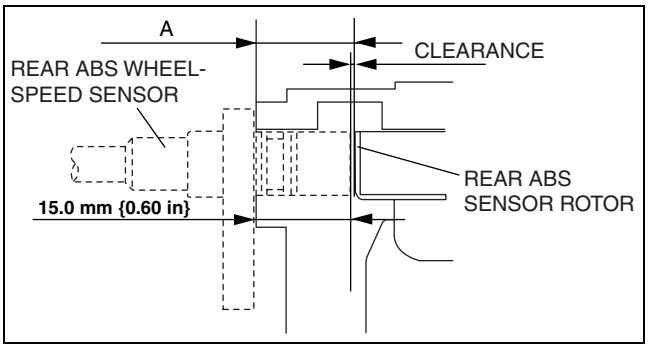
id0415008002a1

### Installation Visual Inspection

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   (1) Excessive play of the ABS wheel-speed sensor
   (2) Deformation of the ABS wheel-speed sensor

### Clearance Inspection

1. Remove the rear ABS wheel-speed sensor.
2. Measure the distance between the rear ABS wheel-speed sensor installation surface and the ABS sensor rotor. This is dimension A.
3. Calculate the clearance between the front ABS wheel-speed sensor and the ABS sensor rotor using the following formula:
   Clearance (mm {in}) = A-15.0
4. Verify that the clearance between the ABS sensor rotor and the rear ABS wheel-speed sensor is as indicated below.
   - If there is any malfunction, replace it.

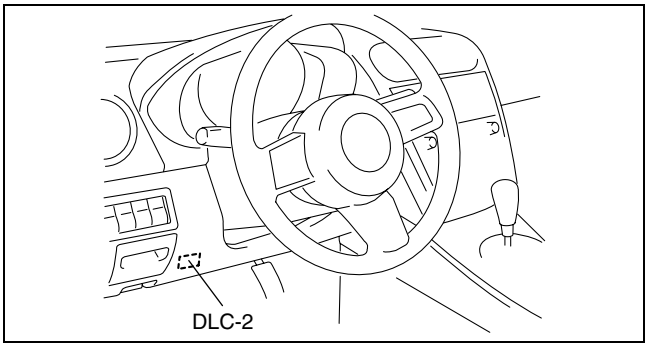



acxuuw00001203

**Clearance**
- **0.3— 1.1 mm {0.012— 0.043 in}**

### Sensor Output Value Inspection

1. Turn the ignition switch off.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs using the M-MDS:
   - WSPD_LR
     (LR ABS wheel-speed sensor)
   - WSPD_RR
     (RR ABS wheel-speed sensor)
4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS shows the same value as the speedometer.
   - If there is any malfunction, replace the rear ABS wheel-speed sensor.




acxuuw00001204

## REAR ABS WHEEL-SPEED SENSOR INSPECTION[AWD]

id0415008002a7

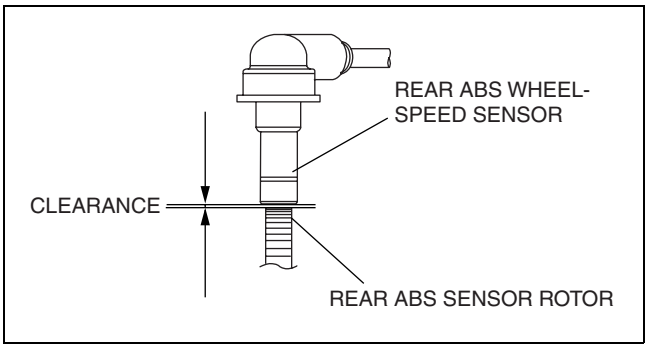
### Installation Visual Inspection

1. Inspect the following items:
   - If there is any malfunction, replace the applicable part.
   (1) Excessive play of the ABS wheel-speed sensor
   (2) Deformation of the ABS wheel-speed sensor
   (3) Deformation or damage of the ABS sensor rotor

### Clearance Inspection

1. Verify the clearance between the ABS sensor rotor and the ABS wheel-speed sensor.
   - If there is any malfunction, check for improper installation, and replace if necessary.

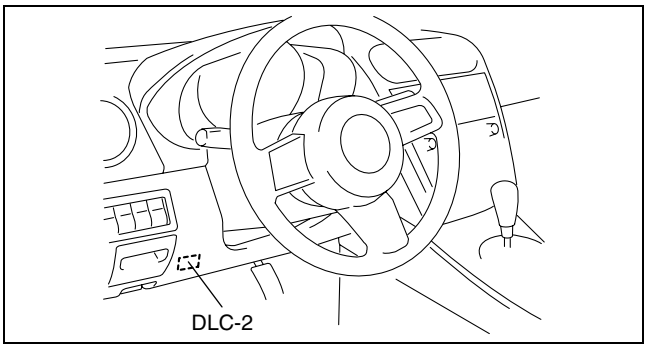
**Clearance**
- **0.3— 1.1 mm {0.012— 0.043 in}**




acxuuw00001372

**Sensor Output Value Inspection**

1. Turn the ignition switch off.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs using the M-MDS:
   - WSPD_LR
     (LR ABS wheel-speed sensor)
   - WSPD_RR
     (RR ABS wheel-speed sensor)
4. Start the engine and drive the vehicle.
5. Verify that the display of the M-MDS shows the same value as the speedometer.
   - If there is any malfunction, replace the rear ABS wheel-speed sensor.




acxuuw00001204

## COMBINED SENSOR REMOVAL/INSTALLATION

id041500801200



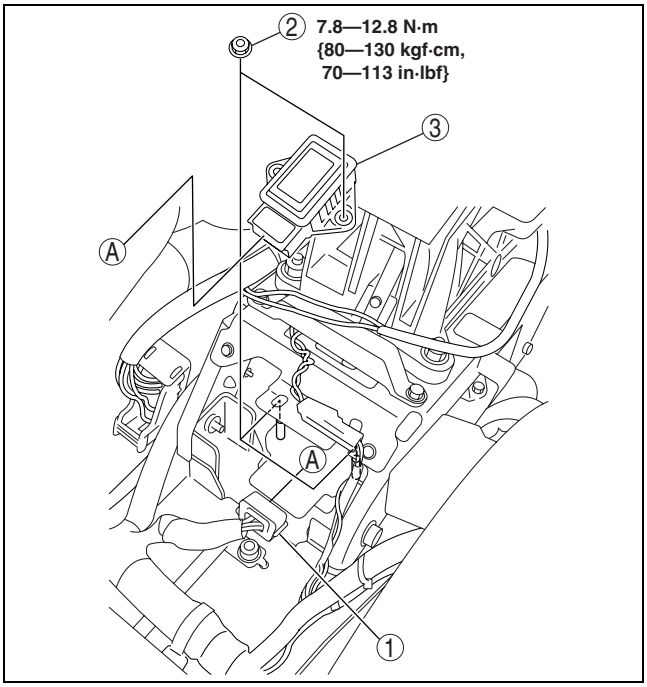
**Caution**

- **The internal parts of the combined sensor could be damaged if dropped. Be careful not to drop the combined sensor. Replace the combined sensor if it is subjected to an impact. Also, do not use an impact wrench or other similar air tools when removing/installing the sensor.**

1. Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
2. Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Combined sensor connector |
| 2 | Nut |
| 3 | Combined sensor |

4. Install in the reverse order of removal.
5. After installation, perform the combined sensor initialization procedure. (See 04-15-17 COMBINED SENSOR INITIALIZATION PROCEDURE.)

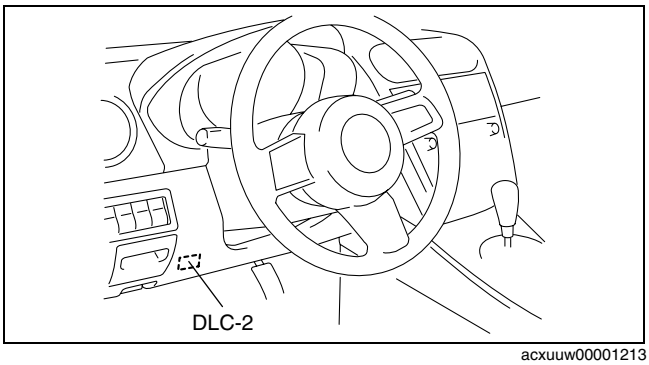



acxuuw00001881

## COMBINED SENSOR INSPECTION

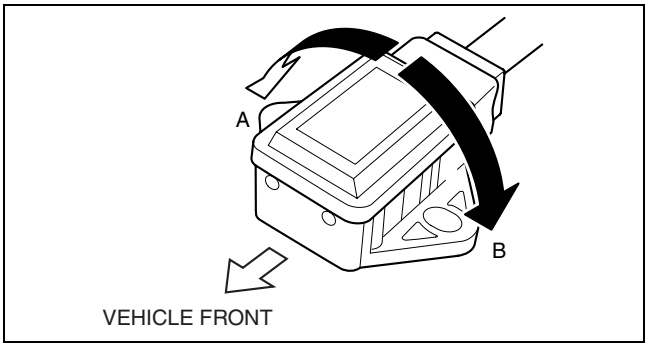
id041500801300

1. Turn the ignition switch off.
2. Connect the M-MDS to the DLC-2.
3. Select the following PIDs, then inspect the lateral acceleration speed and the yaw rate.
   — LAT_ACCL: (lateral acceleration speed)
   — YAW_RATE: (yaw rate)
   (1) Lateral acceleration speed inspection




acxuuw00001213

*1)* Verify the LAT_ACCL change when the combined sensor is tilted to the left and right.
- If there is any malfunction, replace the combined sensor.

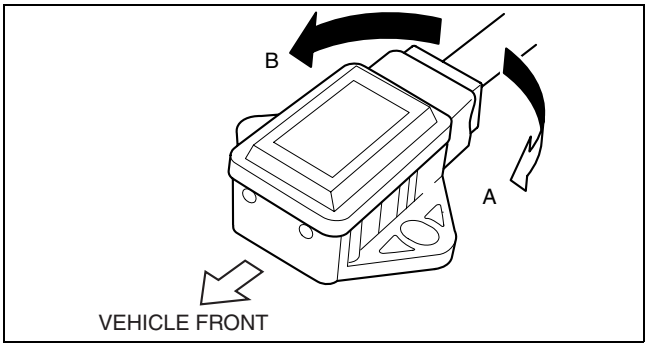



acxuuw00001214

**Standard**
**When the sensor is tilted to the right (A):**
**LAT_ACCL changes negatively.**
**When the sensor is tilted to the left (B):**
**LAT_ACCL changes positively.**

(2) Yaw rate inspection

*1)* Verify the YAW_RATE change when the combined sensor is rotated to the left and right.
- If there is any malfunction, replace the combined sensor.




acxuuw00001215

**Standard**
**When the sensor is rotated to the right (A):**
**YAW_RATE changes negatively.**
**When the sensor is rotated to the left (B):**
**YAW_RATE changes positively.**

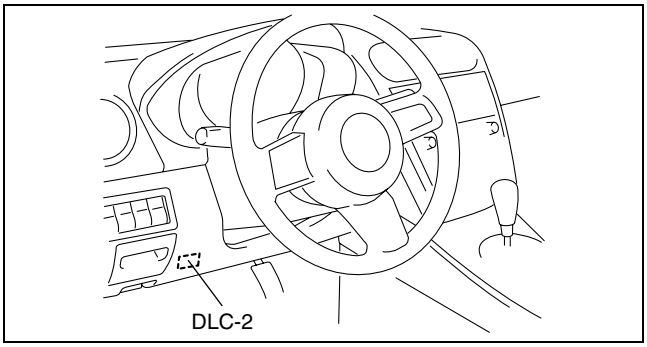
## COMBINED SENSOR INITIALIZATION PROCEDURE

id041500801400

**Warning**

- **Unless the initialization procedure of the combined sensor is completed, the DSC will not operate, causing an unexpected accident. Therefore, always perform the initialization procedure to ensure DSC operation if the combined sensor and DSC HU/CM have been removed or replaced.**

1. Inspect the wheel alignment and inflation pressure.
   - If there is any malfunction, adjust the applicable part.
2. Park the vehicle on level ground.
3. Turn the ignition switch off.
4. Connect the M-MDS to the DLC-2 connector.
5. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Chassis”.
     2. Select “ABS/DSC”.
   - When using the PDS (pocket PC)
     1. Select “All Tests and Calibrations”.
     2. Select “ABS/DSC”.
6. Then, select the “Sensor Initialization” from the screen menu.
7. Then, select items from the screen menu in the following order.
   1. Select “YAWRATE”.
   2. Select “LATACCEL”.
8. Perform the initialization according to the directions on the screen.
9. Drive the vehicle forward.
10. After **5 min** of driving, verify that the DSC system is normal.



acxuuw00001216

## BRAKE FLUID PRESSURE SENSOR INSPECTION

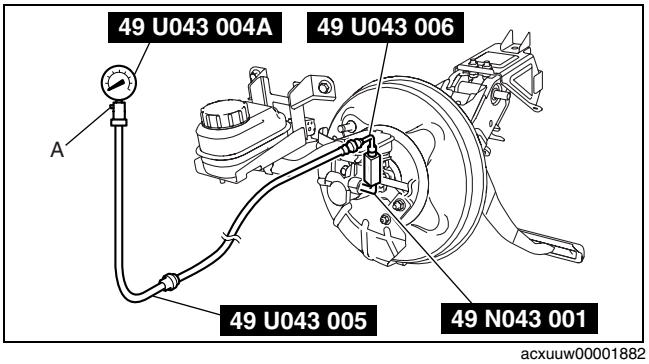
id041500801500

1. Turn the ignition switch off.
2. Install the **SSTs** to the master cylinder.

   **Note**

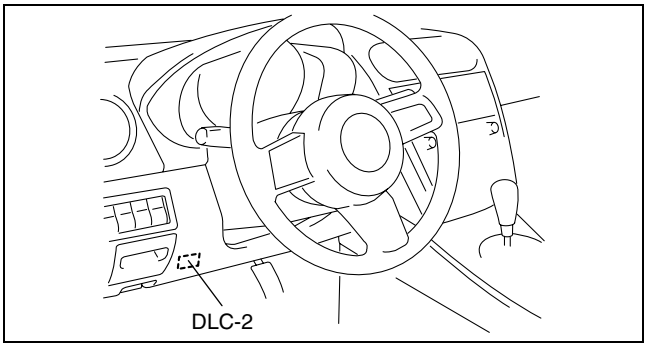
   - Install the **SST** (49 N043 001) to the master cylinder using a commercially available flare nut wrench.
     — Flare nut across flat: **12 mm {0.47 in}**

3. Bleed the air from the **SSTs** and the brake line. (Bleed air from the **SSTs**) through air bleeding valve A.



acxuuw00001882

4. Connect the M-MDS to the DLC-2.
5. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “ABS”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “ABS”.
     3. Select “DataLogger”.
6. Select the “MCYLIP” PID.
7. Start the engine.
8. Depress the brake pedal, and confirm that the fluid pressure value of the **SST** (Gauge) and the value shown on the M-MDS are equal
   - If the fluid pressures are different, replace the DSC HU/CM.



acxuuw00001218

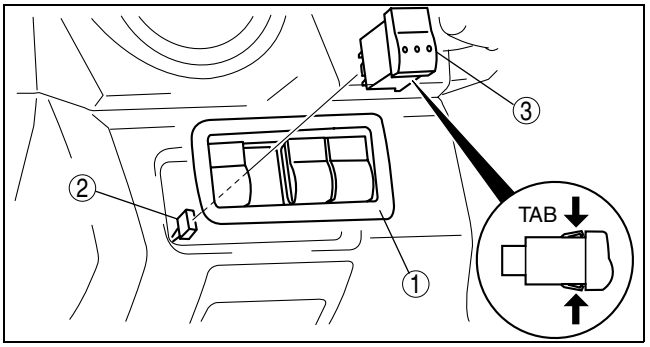
## TCS OFF SWITCH REMOVAL/INSTALLATION

id041500803000

1. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Switch bezel component<br>(See 04-15-18 Switch Bezel Component Removal Note.) |
| 2 | TCS OFF switch connector |
| 3 | TCS OFF switch |

2. Install in the reverse order of removal.




acxuuw00001779

### Switch Bezel Component Removal Note

1. Access the switch bezel component from behind of the dashboard, and squeeze the tabs of the switch bezel component.
2. Remove the switch bezel component from the dashboard.

## TCS OFF SWITCH INSPECTION

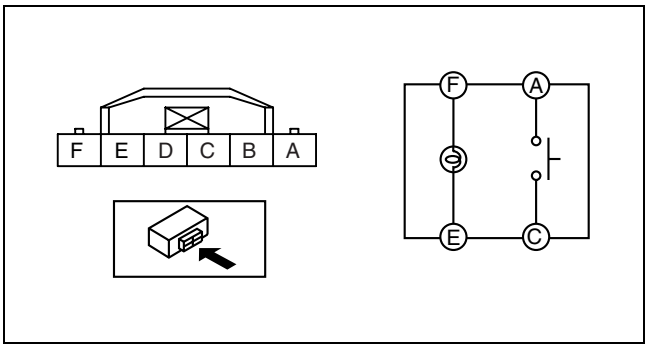
id041500803100

1. Remove the TCS OFF switch. (See 04-15-18 TCS OFF SWITCH REMOVAL/INSTALLATION.)
2. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the TCS OFF switch.

: Bulb : Continuity

| Condition | Terminal | | | |
|---|---|---|---|---|
| | **A** | **C** | **E** | **F** |
| Switch pressed | ○—○ | | ○—◎—○ | |
| Switch released | | | ○—◎—○ | |

acxuuw00001220




acxuuw00001221

# 04-50 TECHNICAL DATA

**BRAKES TECHNICAL DATA . . . . . 04-50–1**

## BRAKES TECHNICAL DATA

id045000800100

| Item | Specification |
|---|---|
| Brake fluid type | SAE J1703, FMVSS 116 DOT-3 |
| Brake pedal height (reference value) | 204.3 mm {8.043 in} |
| Brake pedal play | 2—5 mm {0.08—0.19 in} |
| Brake pedal-to-floor clearance (Brake pedal when depressed at 147 N {15.0 kgf, 33.0 lbf}) | 99.1 mm {3.91 in} or more |
| Front disc plate runout limit | 0.05 mm {0.002 in} |
| Minimum front disc plate thickness | 26 mm {1.03 in} |
| Minimum front disc plate thickness after machining using a brake lathe on-vehicle | 26.8 mm {1.06 in} |
| Minimum front disc pad thickness | 2.0 mm {0.08 in} |
| Rear disc plate runout limit | 0.05 mm {0.002 in} |
| Minimum rear disc plate thickness | 16 mm {0.63 in} |
| Minimum rear disc plate thickness after machining using a brake lathe on-vehicle | 16.8 mm {0.66 in} |
| Minimum rear disc pad thickness | 2.0 mm {0.08 in} |
| Parking brake pedal stroke when depressed at 180 N {18.4 kgf, 40.5 lbf} | 1—3 notches |
| Minimum parking brake shoe thickness | 1.0 mm {0.04 in} |
| Maximum rear disc plate inner diameter | 191.0 mm {7.52 in} |

### Master cylinder fluid pressure

| **Vacuum amount at o kPa {0 mmHg, 0 inHg}** | |
|---|---|
| **Pedal force (N {kgf, lbf})** | **Fluid pressure (kPa {kgf/cm2, psi})** |
| 200 N {20.4kgf, 44.9lbt} | 550 kPa {5.61 kgf/$cm^2$, 79.8 psi} or more |

### Master cylinder fluid pressure

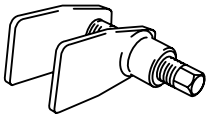
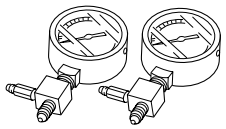
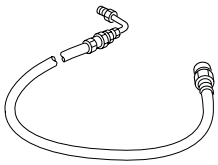
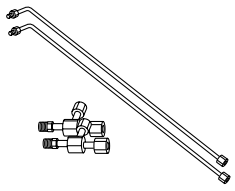
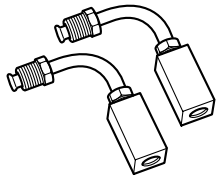
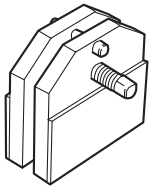
| **Vacuum amount at 66.7 kPa {500 mmHg, 19.7 inHg}** | |
|---|---|
| **Pedal force (N {kgf, lbf})** | **Fluid pressure (kPa {kgf/cm2, psi})** |
| 200 N {20.4kgf, 44.9lbt} | 6,950 kPa {70.88 kgf/$cm^2$, 1.009 psi} or more |

# 04-60 SERVICE TOOLS

**BRAKES SST . . . . . 04-60–1**

## BRAKES SST

id046000800100

| | | |
|---|---|---|
| 49 0259 770B<br>Flare nut wrench<br> | 49 0221 600C<br>Disc brake expand tool<br>  | 49 U043 004A<br>Oil pressure gauge (Part of 49 U043 0A0A)<br>  |
| 49 U043 006<br>Hose (Part of 49 U043 0A0A)<br>  | 49 U043 005<br>Joint (Part of 49 U043 0A0A)<br>  | 49 N043 001<br>Adapter<br>  |
| 49 T033 001A<br>Disc brake piston stopper<br>  | — | — |

# TRANSMISSION/TRANSAXLE

# 05
SECTION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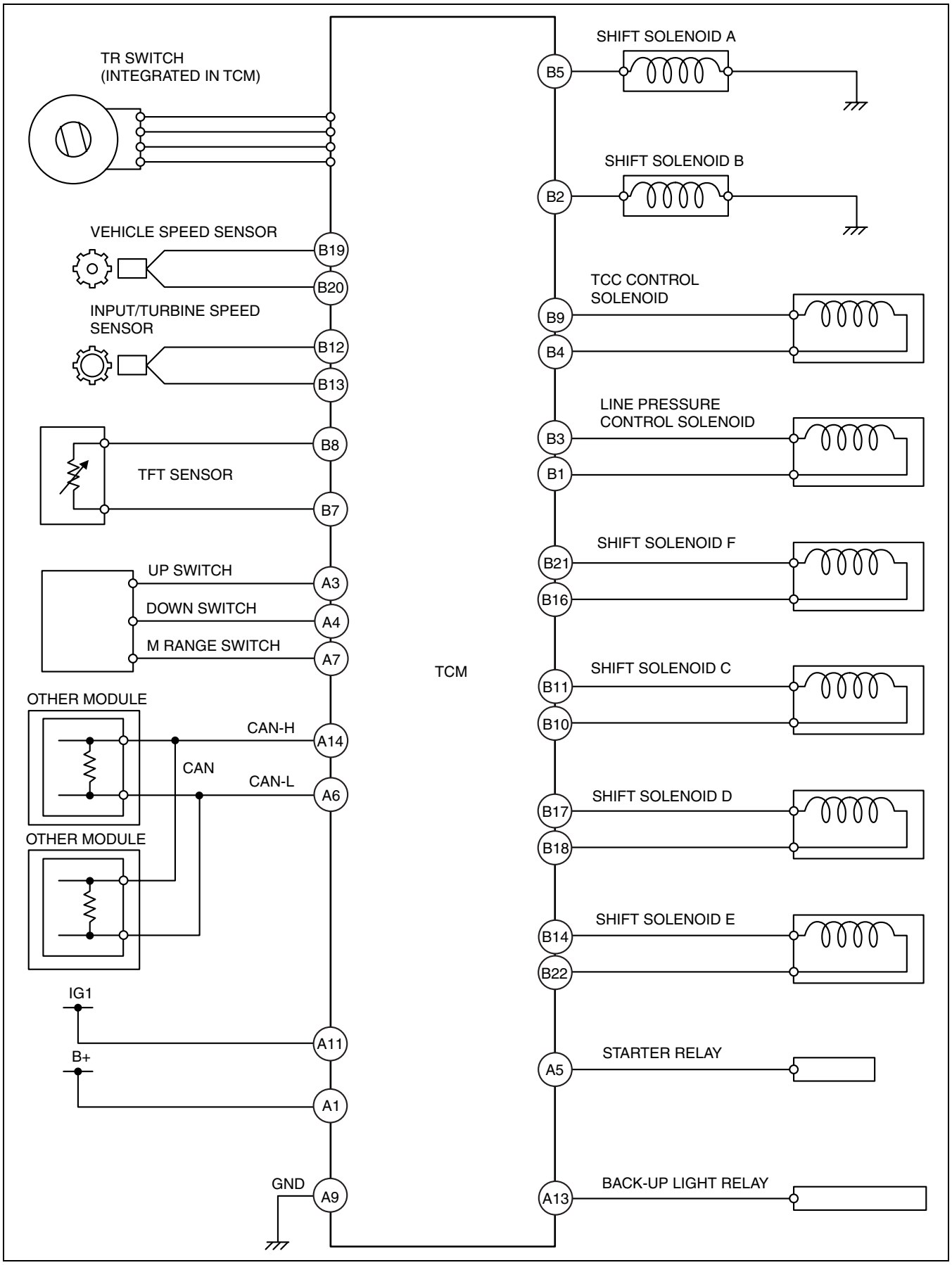
## AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM[AW6A-EL, AW6AX-EL]

id050211800100

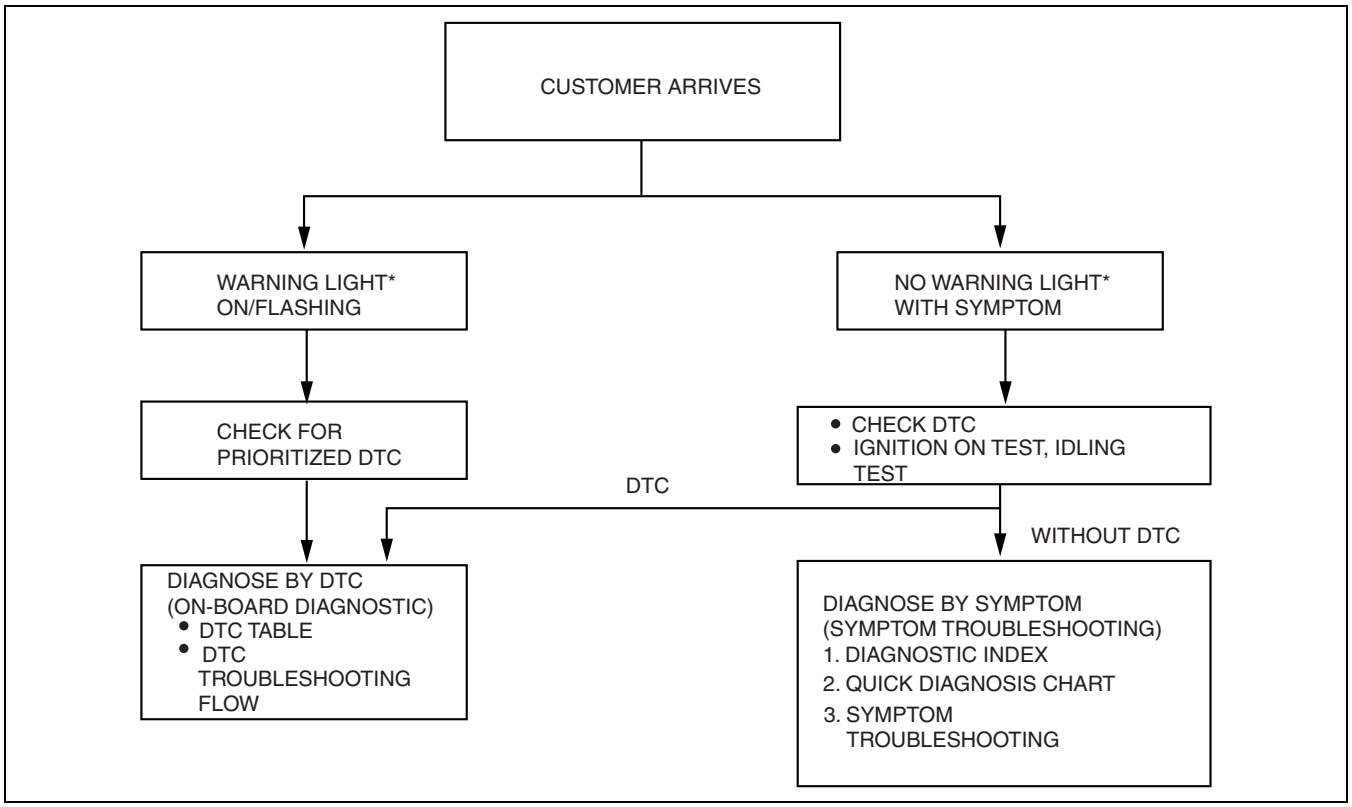



D6U517CS7004

## FOREWORD[AW6A-EL, AW6AX-EL]

id050211800200

- When the customer reports vehicle malfunction, check the malfunction indicator lamp (MIL) indication, AT warning indication, and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - — If a DTC exists, diagnose the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].)
  - — If a DTC does not exist and the MIL and AT warning lights do not illuminate, diagnose the applicable symptom troubleshooting. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)




C6U0502W003

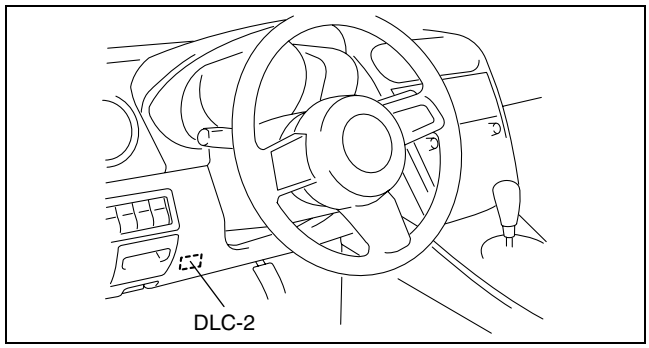
*: Malfunction Indicator Lamp (MIL), AT warning light

## AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION[AW6A-EL, AW6AX-EL]

id050211800300

### DTC Reading Procedure

1. Perform necessary vehicle preparation and visual inspection.
2. Connect the M-MDS to the DLC-2.
3. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the "Toolbox" tab.
     2. Select "Self Test".
     3. Select "Module".
     4. Select "TCM".
   - When using the PDS (pocket PC)
     1. Select "Module Tests".
     2. Select "TCM".
     3. Select "Self Test".
4. Then, select the “Retrieve CMDTCs” and perform procedures according to directions on the M-MDS screen.
5. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
6. After completion of repairs, clear all DTCs stored in the TCM. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)

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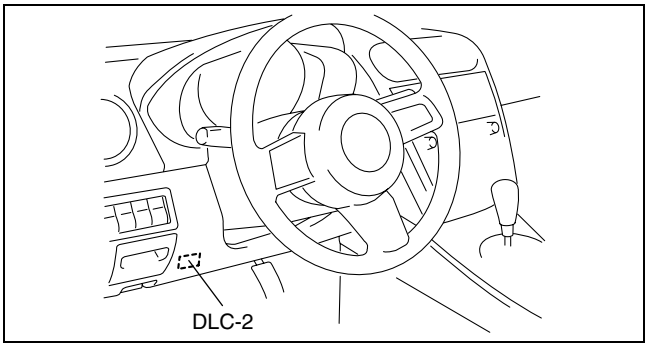
## AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL]

id050211800400

**Caution**
- **After repairing a malfunction, perform this procedure to verify that the malfunction has been corrected.**
- **When this procedure is carried out, be sure to drive the vehicle at lawful speed and pay attention to the other vehicles.**

1. Connect the M-MDS to the vehicle DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Toolbox” tab.
     2. Select “Self Test”.
     3. Select “Module”.
     4. Select “TCM”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “TCM”.
     3. Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Perform the following trouble code inspections to ensure that the DTC has been resolved:
   - For P0601, P0603, P0604, P0780, P0817, P0882, P0883, P0942, P0961, P0962, P0963, P0973, P0974, P0976, P0977, P0978, P0979, P0980, P0981, P0982, P0983, P0984, P0985, P0986, P0997, P0998, P0999, P1700, P2762, P2763, P2764
     i. Start the engine.
     ii. Warm up the engine and ATX.
     iii. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR.
     iv. Go to Step 6.
   - For P0706, P0707, P0708
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.
     iii. Depress the brake pedal, and shift the selector lever from P to D for **5 s or more.**
     iv. Go to Step 6.
   - For P0711
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.
     iii. Drive the vehicle in D range for **15 min or more.**
     iv. Go to Step 6
   - For P0712, P0713
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.
     iii. Drive the vehicle in D range for **150 s or more.**
     iv. Go to Step 6.
   - For P0717, P0722
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.
     iii. Drive the vehicle, two separate times, in D range at **20 km/h {12 mph} or more** for **150 s or more**.
     iv. Go to Step 6.
   - For P0731, P0732
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.
     iii. Drive the vehicle in D range, at **10 km/h {6 mph} or more** for **2 s or more**.
     iv. Go to Step 6.
   - For P0733
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.
     iii. Drive the vehicle in D range, at **20 km/h {12 mph} or more** for **2 s or more**.
     iv. Go to Step 6.
   - For P0729, P0734, P0735
     i. Start the engine.
     ii. Warm up the engine to normal operating temperature.



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iii. Drive the vehicle in D range, at **40 km/h {25 mph} or more** for **2 s or more**.
iv. Go to Step 6.

- For P0736
  i. Start the engine.
  ii. Warm up the engine to normal operating temperature.
  iii. Drive the vehicle in R range.
  iv. Go to Step 6.
- For P0819
  i. Start the engine.
  ii. Warm up the engine to normal operating temperature.
  iii. Drive the vehicle in M range, and shift the selector lever (operate up and down switches) between 1GR to 6GR for **10 s or more.**
  iv. Go to Step 6.
- For P2757
  i. Start the engine.
  ii. Warm up the engine and ATX.
  iii. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR and TCC is operated.
  iv. Go to Step 6.
- For P2758
  i. Start the engine.
  ii. Warm up the engine to normal operating temperature.
  iii. Drive the vehicle in D range and make sure that the gears shift smoothly from 1GR to 6GR and TCC is no operated.
  iv. Go to Step 6.

6. Gradually slow down and stop the vehicle.
7. Make sure that no DTCs occur.



**DTC TABLE[AW6A-EL, AW6AX-EL]**

id050211800500

X: Available

| DTC No. | Condition | MIL | AT warning light | DC | Monitor item | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0601 | Flash ROM malfunction | X | X | 1 | CCM | X | (See 05-02-10 DTC P0601[AW6A-EL, AW6AX-EL]) |
| P0603 | EEPROM malfunction | X | X | 1 | – | X | (See 05-02-10 DTC P0603[AW6A-EL, AW6AX-EL]) |
| P0604 | RAM malfunction | X | X | 1 | CCM | X | (See 05-02-11 DTC P0604[AW6A-EL, AW6AX-EL]) |
| P0706 | Transaxle range (TR) switch circuit range/ performance | X | X | 1 | Other | X | (See 05-02-12 DTC P0706[AW6A-EL, AW6AX-EL]) |
| P0707 | Transaxle range (TR) switch circuit low input | X | X | 1 | CCM | X | (See 05-02-12 DTC P0707[AW6A-EL, AW6AX-EL]) |
| P0708 | Transaxle range (TR) switch circuit high input | X | X | 1 | CCM | X | (See 05-02-13 DTC P0708[AW6A-EL, AW6AX-EL]) |

| DTC No. | Condition | MIL | AT warning light | DC | Monitor item | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0711 | Transaxle fluid temperature (TFT) sensor malfunction (stuck) | X | X | 1 | CCM | X | (See 05-02-14 DTC P0711[AW6A-EL, AW6AX-EL]) |
| P0712 | Transaxle fluid temperature (TFT) sensor circuit malfunction (short to ground) | X | X | 1 | CCM | X | (See 05-02-15 DTC P0712[AW6A-EL, AW6AX-EL]) |
| P0713 | Transaxle fluid temperature (TFT) sensor circuit malfunction (short to power/open circuit) | X | X | 1 | CCM | X | (See 05-02-17 DTC P0713[AW6A-EL, AW6AX-EL]) |
| P0717 | Input/turbine speed sensor circuit malfunction (open circuit/short circuit) | X | X | 1 | CCM | X | (See 05-02-18 DTC P0717[AW6A-EL, AW6AX-EL]) |
| P0722 | Vehicle speed sensor (VSS) circuit malfunction (open circuit/short circuit) | X | X | 1 | CCM | X | (See 05-02-20 DTC P0722[AW6A-EL, AW6AX-EL]) |
| P0729 | Gear 6 incorrect (incorrect gear ratio detected) | X | X | 1 | CCM | X | (See 05-02-22 DTC P0729[AW6A-EL, AW6AX-EL]) |
| P0730 | Gear 1 and engine brake operation incorrect (incorrect gear ratio detected) | – | X | 1 | CCM | X | (See 05-02-24 DTC P0730[AW6A-EL, AW6AX-EL]) |
| P0731 | Gear 1 incorrect (incorrect gear ratio detected) | X | X | 1 | CCM | X | (See 05-02-26 DTC P0731[AW6A-EL, AW6AX-EL]) |
| P0732 | Gear 2 incorrect (incorrect gear ratio detected) | X | X | 1 | CCM | X | (See 05-02-27 DTC P0732[AW6A-EL, AW6AX-EL]) |
| P0733 | Gear 3 incorrect (incorrect gear ratio detected) | X | X | 1 | CCM | X | (See 05-02-29 DTC P0733[AW6A-EL, AW6AX-EL]) |
| P0734 | Gear 4 incorrect (incorrect gear ratio detected) | X | X | 1 | CCM | X | (See 05-02-30 DTC P0734[AW6A-EL, AW6AX-EL]) |
| P0735 | Gear 5 incorrect (incorrect gear ratio detected) | X | X | 1 | CCM | X | (See 05-02-32 DTC P0735[AW6A-EL, AW6AX-EL]) |

| DTC No. | Condition | MIL | AT warning light | DC | Monitor item | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0736 | Gear reverse incorrect (incorrect gear ratio detected) | – | X | 1 | – | X | (See 05-02-33 DTC P0736[AW6A-EL, AW6AX-EL]) |
| P0780 | Valve control solenoid circuit malfunction (valve stuck) | – | X | 1 | CCM | X | (See 05-02-35 DTC P0780[AW6A-EL, AW6AX-EL]) |
| P0817 | Starter relay No.2 circuit malfunction (open circuit/short circuit) | – | X | 1 | – | X | (See 05-02-36 DTC P0817[AW6A-EL, AW6AX-EL]) |
| P0819 | Manual switch/up switch/down switch circuit malfunction (open circuit/short circuit) | – | X | 1 | – | X | (See 05-02-38 DTC P0819[AW6A-EL, AW6AX-EL]) |
| P0882 | TCM B+ low | – | – | 1 | CCM | X | (See 05-02-40 DTC P0882[AW6A-EL, AW6AX-EL]) |
| P0883 | TCM B+ high | – | – | 1 | CCM | X | (See 05-02-42 DTC P0883[AW6A-EL, AW6AX-EL]) |
| P0942 | Valve control solenoid circuit malfunction at D range (valve stuck) | X | X | 1 | CCM | X | (See 05-02-42 DTC P0942[AW6A-EL, AW6AX-EL]) |
| P0961 | Line pressure control solenoid range/ performance (stuck) | X | X | 1 | CCM | X | (See 05-02-44 DTC P0961[AW6A-EL, AW6AX-EL]) |
| P0962 | Line pressure control solenoid circuit malfunction (short to ground/open circuit) | X | X | 1 | CCM | X | (See 05-02-45 DTC P0962[AW6A-EL, AW6AX-EL]) |
| P0963 | Line pressure control solenoid circuit malfunction (short to power) | X | X | 1 | CCM | X | (See 05-02-47 DTC P0963[AW6A-EL, AW6AX-EL]) |
| P0973 | Shift solenoid A circuit malfunction (short to ground) | X | X | 1 | CCM | X | (See 05-02-49 DTC P0973[AW6A-EL, AW6AX-EL]) |
| P0974 | Shift solenoid A circuit malfunction (short to power/open circuit) | X | X | 1 | CCM | X | (See 05-02-51 DTC P0974[AW6A-EL, AW6AX-EL]) |

| DTC No. | Condition | MIL | AT warning light | DC | Monitor item | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0976 | Shift solenoid B circuit malfunction (short to ground) | – | X | 1 | – | X | (See 05-02-53 DTC P0976[AW6A-EL, AW6AX-EL]) |
| P0977 | Shift solenoid B circuit malfunction (short to power/open circuit) | – | X | 1 | – | X | (See 05-02-55 DTC P0977[AW6A-EL, AW6AX-EL]) |
| P0978 | Shift solenoid C range/performance (stuck) | X | X | 1 | CCM | X | (See 05-02-57 DTC P0978[AW6A-EL, AW6AX-EL]) |
| P0979 | Shift solenoid C circuit malfunction (short to ground/open circuit) | X | X | 1 | CCM | X | (See 05-02-59 DTC P0979[AW6A-EL, AW6AX-EL]) |
| P0980 | Shift solenoid C circuit malfunction (short to power) | X | X | 1 | CCM | X | (See 05-02-61 DTC P0980[AW6A-EL, AW6AX-EL]) |
| P0981 | Shift solenoid D range/performance (stuck) | X | X | 1 | CCM | X | (See 05-02-63 DTC P0981[AW6A-EL, AW6AX-EL]) |
| P0982 | Shift solenoid D circuit malfunction (short to ground/open circuit) | X | X | 1 | CCM | X | (See 05-02-64 DTC P0982[AW6A-EL, AW6AX-EL]) |
| P0983 | Shift solenoid D circuit malfunction (short to power) | X | X | 1 | CCM | X | (See 05-02-66 DTC P0983[AW6A-EL, AW6AX-EL]) |
| P0984 | Shift solenoid E range/performance (stuck) | X | X | 1 | CCM | X | (See 05-02-68 DTC P0984[AW6A-EL, AW6AX-EL]) |
| P0985 | Shift solenoid E circuit malfunction (short to ground/open circuit) | X | X | 1 | CCM | X | (See 05-02-69 DTC P0985[AW6A-EL, AW6AX-EL]) |
| P0986 | Shift solenoid E circuit malfunction (short to power) | X | X | 1 | CCM | X | (See 05-02-71 DTC P0986[AW6A-EL, AW6AX-EL]) |
| P0997 | Shift solenoid F range/performance (stuck) | X | X | 1 | CCM | X | (See 05-02-73 DTC P0997[AW6A-EL, AW6AX-EL]) |

| DTC No. | Condition | MIL | AT warning light | DC | Monitor item | Memory function | Page |
|---|---|---|---|---|---|---|---|
| P0998 | Shift solenoid F circuit malfunction (short to ground/open circuit) | X | X | 1 | CCM | X | (See 05-02-74 DTC P0998[AW6A-EL, AW6AX-EL]) |
| P0999 | Shift solenoid F circuit malfunction (short to power) | X | X | 1 | CCM | X | (See 05-02-76 DTC P0999[AW6A-EL, AW6AX-EL]) |
| P1700 | Valve control solenoid circuit malfunction at R range (valve stuck) | – | X | 1 | – | X | (See 05-02-78 DTC P1700[AW6A-EL, AW6AX-EL]) |
| P2757 | Torque converter clutch (TCC) stuck off | X | X | 1 | CCM | X | (See 05-02-79 DTC P2757[AW6A-EL, AW6AX-EL]) |
| P2758 | Torque converter clutch (TCC) stuck on | X | X | 1 | CCM | X | (See 05-02-80 DTC P2758[AW6A-EL, AW6AX-EL]) |
| P2762 | TCC control solenoid range/performance (stuck) | X | X | 1 | CCM | X | (See 05-02-82 DTC P2762[AW6A-EL, AW6AX-EL]) |
| P2763 | TCC control solenoid circuit malfunction (short to power) | X | X | 1 | CCM | X | (See 05-02-83 DTC P2763[AW6A-EL, AW6AX-EL]) |
| P2764 | TCC control solenoid circuit malfunction (short to ground/open circuit) | X | X | 1 | CCM | X | (See 05-02-85 DTC P2764[AW6A-EL, AW6AX-EL]) |
| U0073 | CAN BUS OFF | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0100 | TCM cannot receive any signals from PCM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0121 | TCM cannot receive any signals from ABS HU/CM | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0140 | TCM cannot receive any signals from instrument cluster | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |
| U0415 | Invalid data received from ABS HU/CM (wheel speed) | (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) | | | | | |

MIL: Malfunction Indicator Lamp
DC: Drive Cycle
CCM: Comprehensive Component Monitor
– : N/A

### DTC P0601[AW6A-EL, AW6AX-EL]

id050211800600

| DTC P0601 | Flash ROM malfunction |
|---|---|
| DETECTION CONDITION | • Flash ROM (in TCM) internal circuit malfunction is detected.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0601 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0603[AW6A-EL, AW6AX-EL]

id050211800700

| DTC P0603 | EEPROM malfunction |
|---|---|
| DETECTION CONDITION | • Different numeric values for EEPRROM and RAM (in TCM) are detected.<br>**Diagnostic support note:**<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0603 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |



### DTC P0604[AW6A-EL, AW6AX-EL]

id050211800800

| DTC P0604 | RAM malfunction |
|---|---|
| DETECTION CONDITION | • RAM (in TCM) read/write error is detected.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0604 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0706[AW6A-EL, AW6AX-EL]

id050211800900

| DTC P0706 | Transaxle range (TR) switch circuit range/performance |
|---|---|
| DETECTION CONDITION | • TCM detects stuck TR switch when ignition switch is at ON position.<br>**Diagnostic support note:**<br>• This is continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TR switch malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0706 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in each range (P— D).<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0707[AW6A-EL, AW6AX-EL]

id050211801000

| DTC P0707 | Transaxle range (TR) switch circuit low input |
|---|---|
| DETECTION CONDITION | • TR switch position voltage input to TCM is less than 0.127 V when ignition switch is at ON position.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TR switch malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0707 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in each range (P— D).<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |



### DTC P0708[AW6A-EL, AW6AX-EL]

id050211801100

| DTC P0708 | Transaxle range (TR) switch circuit high input |
|---|---|
| DETECTION CONDITION | • TR switch position voltage input to TCM is 4.84 V or more when ignition switch is at ON position.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TR switch malfunction<br>• TCM malfunction |

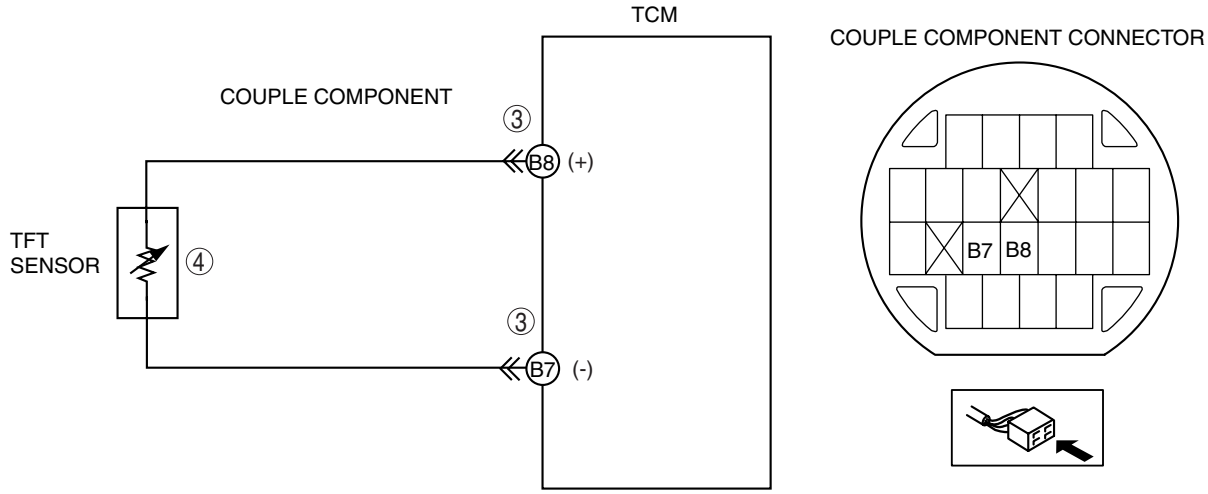
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | **VERIFY TROUBLESHOOTING OF DTC P0708 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in each range (P— D).<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0711[AW6A-EL, AW6AX-EL]

id050211801200

| DTC P0711 | Transaxle fluid temperature (TFT) sensor malfunction (stuck) |
|---|---|
| DETECTION CONDITION | • Change in ATF temperature cannot be detected for **15 min or more** when driving in D range.<br>**Diagnostic support note:**<br>• This is continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TFT sensor malfunction<br>• Damaged connector TCM<br>• TCM malfunction |




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 5. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT RESISTANCE OF TFT SENSOR CIRCUIT**<br>• Inspect for resistance between couple component terminals B8 and B7 (wiring harness-side).<br>• Is resistance as shown below?<br>— ATF temperature **10°C {50°F}**: **5.62— 7.31 kilohms**<br>— ATF temperature **25°C {77°F}**: **3.5 kilohms**<br>— ATF temperature **110°C {230°F}**: **0.22— 0.27 kilohms**<br>(See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Replace the TFT sensor, then go to the next step.<br>(See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0711 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

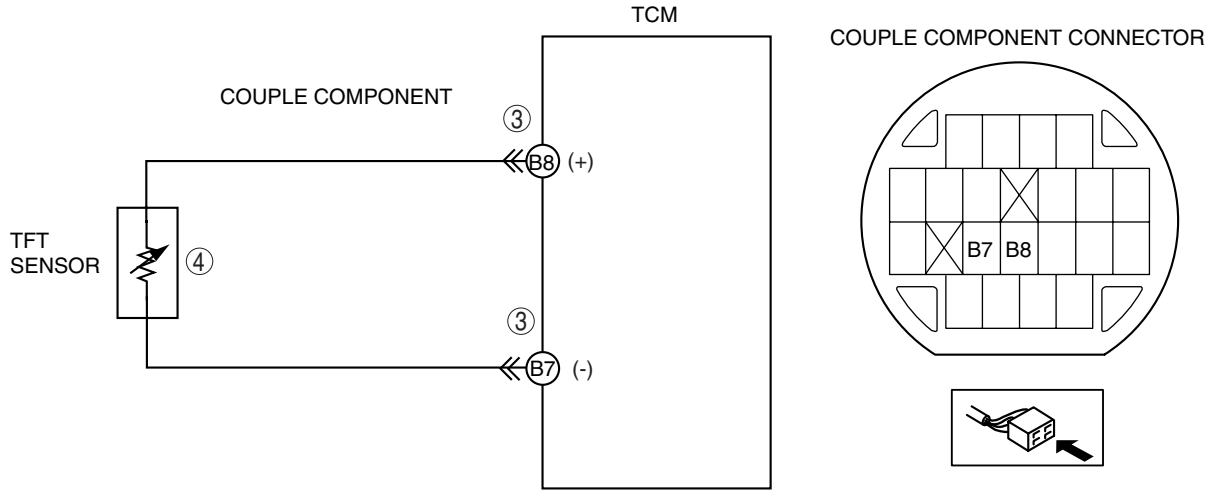


### DTC P0712[AW6A-EL, AW6AX-EL]

id050211801300

| DTC P0712 | Transaxle fluid temperature (TFT) sensor circuit malfunction (short to ground) |
|---|---|
| DETECTION CONDITION | • If the TCM detects the following condition for **10 s or more**, the TCM determines that the TFT sensor circuit has a malfunction.<br>— ATF temperature **200 °C {392 °F} or more**<br>**Diagnostic support note:**<br>• This is continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • TFT sensor malfunction<br>• Short to ground in wiring harness between TFT sensor and TCM terminal B8<br>• Short to ground in wiring harness between TFT sensor and TCM terminal B7<br>• Damaged connector TCM<br>• TCM malfunction |

| DTC P0712 | Transaxle fluid temperature (TFT) sensor circuit malfunction (short to ground) |
|---|---|




**Diagnostic procedure**

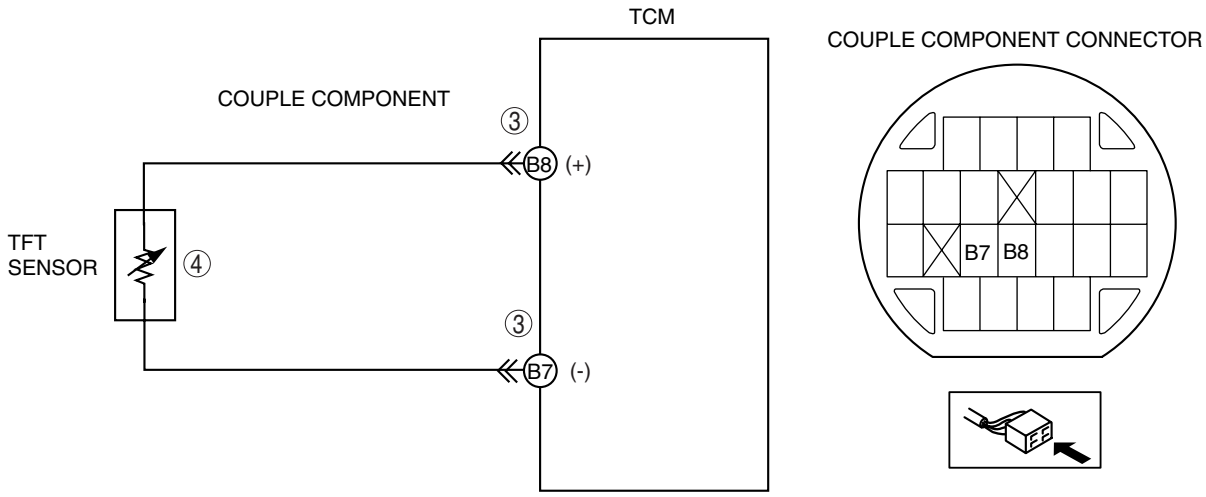
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 5. |
| 4 | **INSPECT RESISTANCE OF TFT SENSOR CIRCUIT**<br>• Inspect for resistance between couple component terminals B8 and B7 (wiring harness-side).<br>• Is resistance as shown below?<br>— ATF temperature **10°C {50°F}**: **5.62— 7.31 kilohms**<br>— ATF temperature **25°C {77°F}**: **3.5 kilohms**<br>— ATF temperature **110°C {230°F}**: **0.22— 0.27 kilohms**<br>(See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Replace the TFT sensor, then go to the next step. (See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0712 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0713[AW6A-EL, AW6AX-EL]

id050211801400

| DTC P0713 | Transaxle fluid temperature (TFT) sensor circuit malfunction (short to power/open circuit) |
|---|---|
| **DETECTION CONDITION** | • If the TCM detects the following condition for **1 s or more**, the TCM determines that the TFT sensor circuit has a malfunction.<br>— Engine warmed-up<br>— ATF temperature **less than –43 °C {–45.4 °F}**<br>**Diagnostic support note:**<br>• This is continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • TFT sensor malfunction<br>• Open circuit in wiring harness between TFT sensor and TCM terminal B8<br>• Open circuit in wiring harness between TFT sensor and TCM terminal B7<br>• Short to power in wiring harness between TFT sensor and TCM terminal B8<br>• Short to power in wiring harness between TFT sensor and TCM terminal B7<br>• Damaged connector TCM<br>• TCM malfunction |



**Diagnostic procedure**

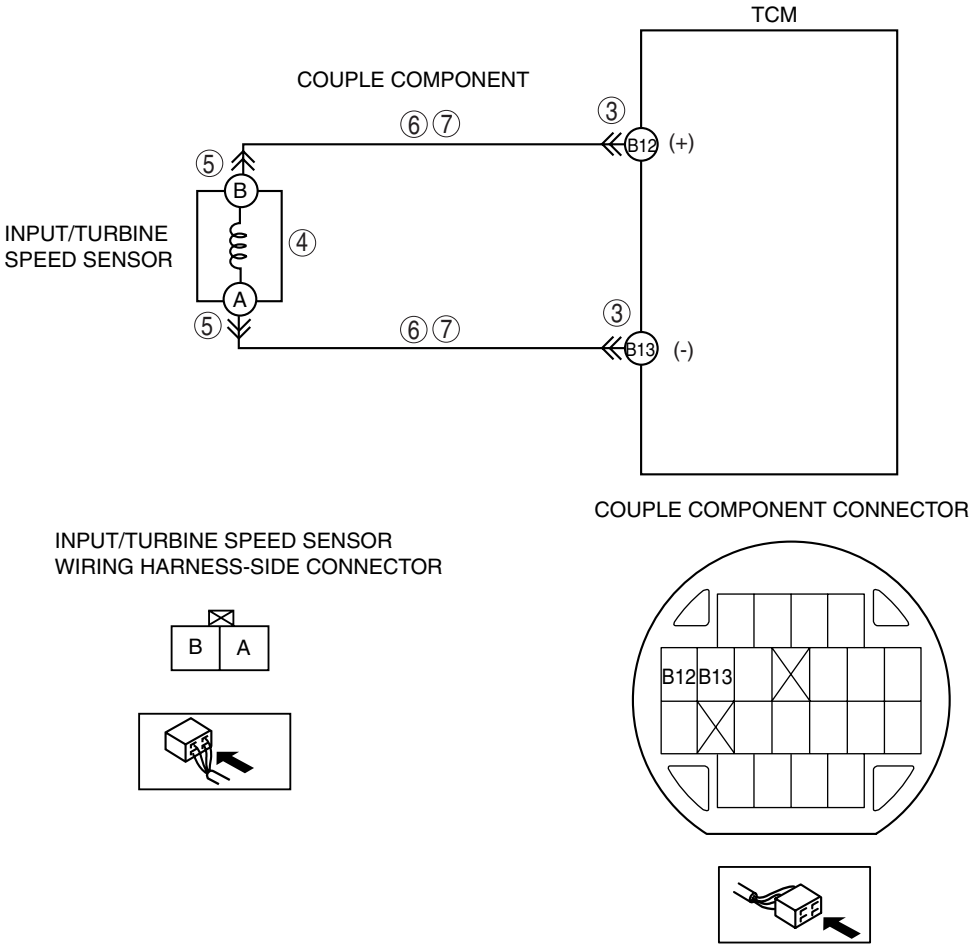
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 5. |
| 4 | **INSPECT RESISTANCE OF TFT SENSOR CIRCUIT**<br>• Inspect for resistance between couple component terminals B8 and B7 (wiring harness-side).<br>• Is resistance as shown below?<br>— ATF temperature **10°C {50°F}**: **5.62— 7.31 kilohms**<br>— ATF temperature **25°C {77°F}**: **3.5 kilohms**<br>— ATF temperature **110°C {230°F}**: **0.22— 0.27 kilohms**<br>(See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Replace the TFT sensor, then go to the next step. (See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | **VERIFY TROUBLESHOOTING OF DTC P0713 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 6 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

**DTC P0717[AW6A-EL, AW6AX-EL]**

id050211801500

| DTC P0717 | Input/turbine speed sensor circuit malfunction (open circuit/short circuit) |
|---|---|
| **DETECTION CONDITION** | • When all conditions below are satisfied.<br>— D range of TR switch input<br>— Driving vehicle at vehicle speed of **20 km/h {12 mph} or more**<br>— Vehicle speed signal 24 pulse input<br>— Input/turbine speed sensor signal not input<br>• Normal turbine speed signal is not input.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |

| DTC P0717 | Input/turbine speed sensor circuit malfunction (open circuit/short circuit) |
|---|---|
| POSSIBLE CAUSE | • Input/turbine speed sensor malfunction<br>• Open circuit between input/turbine speed sensor terminal B and TCM terminal B12<br>• Open circuit between input/turbine speed sensor terminal A and TCM terminal B13<br>• Short to ground in wiring harness between input/turbine speed sensor terminal B and TCM terminal B12<br>• Short to ground in wiring harness between input/turbine speed sensor terminal A and TCM terminal B13<br>• Short to power in wiring harness between input/turbine speed sensor terminal B and TCM terminal B12<br>• Short to power in wiring harness between input/turbine speed sensor terminal A and TCM terminal B13<br>• Damaged connector between input/turbine speed sensor and TCM<br>• TCM malfunction |




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |

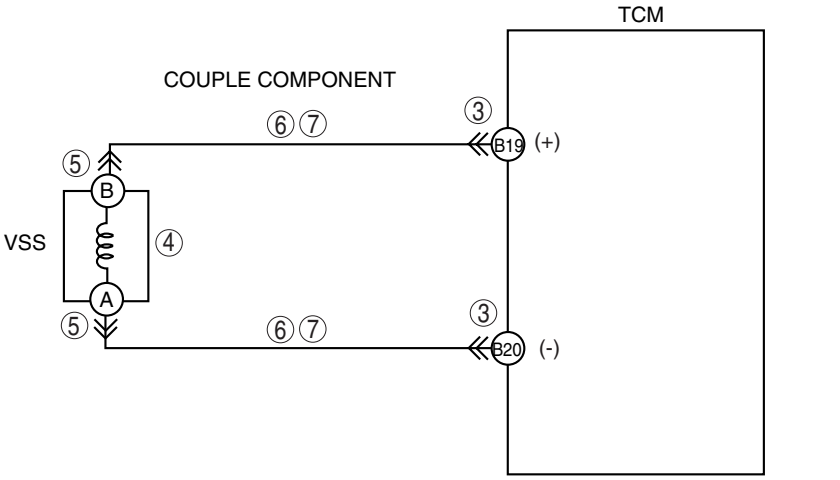
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT CONTINUITY OF INPUT/TURBINE SPEED SENSOR CIRCUIT**<br>• Inspect for continuity between the couple component terminals B12 and B13 (wiring harness-side).<br>• Is there continuity? | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL INPUT/TURBINE SPEED SENSOR FOR POOR CONNECTION**<br>• Disconnect the input/turbine speed sensor connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals (wiring harness-side) and input/turbine speed sensor terminals (wiring wiring harness-side).<br>— Terminal B12 and terminal B<br>— Terminal B13 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO CIRCUIT**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B12 and all terminals except B12/ B13 (wiring harness-side).<br>— Terminal B13 and all terminals except B12/ B13 (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the input/turbine speed sensor, then go to the next step.<br>(See05-17-17 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0717 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0722[AW6A-EL, AW6AX-EL]

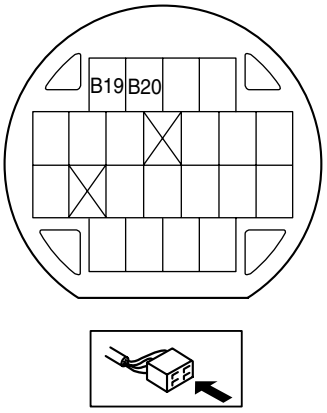
id050211801600

| DTC P0722 | Vehicle speed sensor (VSS) circuit malfunction (open circuit/short circuit) |
|---|---|
| **DETECTION CONDITION** | • When all conditions below are satisfied.<br>— D range of TR switch input<br>— Driving vehicle at vehicle speed of **20 km/h {12 mph} or more**<br>— Turbine speed signal 16 pulse input<br>— VSS signal not input<br>• Normal vehicle speed signal is not input for 0.1 s or more.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |

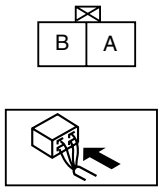
| DTC P0722 | Vehicle speed sensor (VSS) circuit malfunction (open circuit/short circuit) |
|---|---|
| POSSIBLE CAUSE | • VSS malfunction<br>• Open circuit between VSS terminal B and TCM terminal B19<br>• Open circuit between VSS terminal A and TCM terminal B20<br>• Short to ground in wiring harness between VSS terminal B and TCM terminal B19<br>• Short to ground in wiring harness between VSS terminal A and TCM terminal B20<br>• Short to power in wiring harness between VSS terminal B and TCM terminal B19<br>• Short to power in wiring harness between VSS terminal A and TCM terminal B20<br>• Damaged connector between VSS and TCM<br>• TCM malfunction |




COUPLE COMPONENT CONNECTOR




VSS WIRING HARNESS-SIDE CONNECTOR




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT CONTINUITY OF VSS CIRCUIT**<br>• Inspect for continuity between the couple component terminals B19 and B20 (wiring harness-side).<br>• Is there continuity? | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL VSS FOR POOR CONNECTION**<br>• Disconnect the VSS connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals (wiring harness-side) and VSS terminals (wiring harness-side).<br>— Terminal B19 and terminal B<br>— Terminal B20 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO CIRCUIT**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B19 and all terminals except B19/ B20 (wiring harness-side).<br>— Terminal B20 and all terminals except B19/ B20 (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Inspect the coupler component.<br>• If the coupler component is normal, replace the automatic transaxle, then go to the next step. (See05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0722 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0729[AW6A-EL, AW6AX-EL]

id050211801700

| DTC P0729 | Gear 6 incorrect (incorrect gear ratio detected) |
|---|---|
| DETECTION CONDITION | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 6GR in D range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |

| DTC P0729 | Gear 6 incorrect (incorrect gear ratio detected) |
|---|---|
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid C stuck<br>• Shift solenoid E stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• B1 brake slipping<br>• C2 clutch slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0729 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 6GR<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0730[AW6A-EL, AW6AX-EL]

id050211801800

| DTC P0730 | Gear 1 and engine brake operation incorrect (incorrect gear ratio detected) |
|---|---|
| **DETECTION CONDITION** | • Engine braking is detected to be not operating when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 1GR in M range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL does not illuminate if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid A stuck<br>• Shift solenoid B stuck<br>• Shift solenoid D stuck<br>• Shift solenoid E stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C1 clutch slipping<br>• B2 brake slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0730 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID):**20 °C {68 °F} or more**<br>— Drive in the M range, 1GR<br>— Accelerator opening angle (THOP PID):**10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0731[AW6A-EL, AW6AX-EL]

id050211801900

| DTC P0731 | Gear 1 incorrect (incorrect gear ratio detected) |
|---|---|
| DETECTION CONDITION | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 1GR in D range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid D stuck<br>• Shift solenoid E stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C1 clutch slipping<br>• One-way clutch slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0731 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 1GR<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |



### DTC P0732[AW6A-EL, AW6AX-EL]

id050211802000

| DTC P0732 | Gear 2 incorrect (incorrect gear ratio detected) |
|---|---|
| **DETECTION CONDITION** | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 2GR in D range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid D stuck<br>• Shift solenoid E stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C1 clutch slipping<br>• B1 brake slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0732 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 2GR<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0733[AW6A-EL, AW6AX-EL]

id050211802100

| DTC P0733 | Gear 3 incorrect (incorrect gear ratio detected) |
|---|---|
| DETECTION CONDITION | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 3GR in D range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid D stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C1 clutch slipping<br>• C3 clutch slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0733 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 3GR<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0734[AW6A-EL, AW6AX-EL]

id050211802200

| DTC P0734 | Gear 4 incorrect (incorrect gear ratio detected) |
|---|---|
| **DETECTION CONDITION** | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 4GR in D range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid E stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C1 clutch slipping<br>• C2 clutch slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0734 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 4GR<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0735[AW6A-EL, AW6AX-EL]

id050211802300

| DTC P0735 | Gear 5 incorrect (incorrect gear ratio detected) |
|---|---|
| DETECTION CONDITION | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 5GR in D range<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid C stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C2 clutch slipping<br>• C3 clutch slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0735 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 5GR<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |



### DTC P0736[AW6A-EL, AW6AX-EL]

id050211802400

| DTC P0736 | Gear reverse incorrect (incorrect gear ratio detected) |
|---|---|
| **DETECTION CONDITION** | • Incorrect gear ratio detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in R position<br>— Engine running<br>— Accelerator opening angle **10% or more**<br>— Vehicle speed signal normal<br>**Diagnostic support note:**<br>• The MIL does not illuminate if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid C stuck<br>• Shift solenoid D stuck<br>• Shift solenoid E stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Line pressure low<br>• C3 clutch slipping<br>• B2 brake slipping<br>• Control valve stuck<br>• Oil pump malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Inspect the ATF condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the transaxle, then go to Step 8. |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification? (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 8. |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 8.<br>Any ranges: Replace the control valve body, then go to Step 8.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go to Step 8.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0736 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle under the following conditions at least 12 times for **more than 1 s:**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the R position<br>— Accelerator opening angle (THOP PID): **10% or more**<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0780[AW6A-EL, AW6AX-EL]

id050211802500

| DTC P0780 | Valve control solenoid circuit malfunction (valve stuck) |
|---|---|
| DETECTION CONDITION | • Irregular shift control detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— ATF temperature **65 °C {149 °F} or more**<br>— Engine running<br>— Driving in D range<br>— Counter drive gear (output) revolution speed **300 rpm or more (VSS)**<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Shift solenoid A stuck<br>• Shift solenoid B stuck<br>• Shift solenoid C stuck<br>• Shift solenoid D stuck<br>• Shift solenoid E stuck<br>• Shift solenoid F stuck<br>• Line pressure control solenoid stuck<br>• Control valve stuck<br>• TCM malfunction |



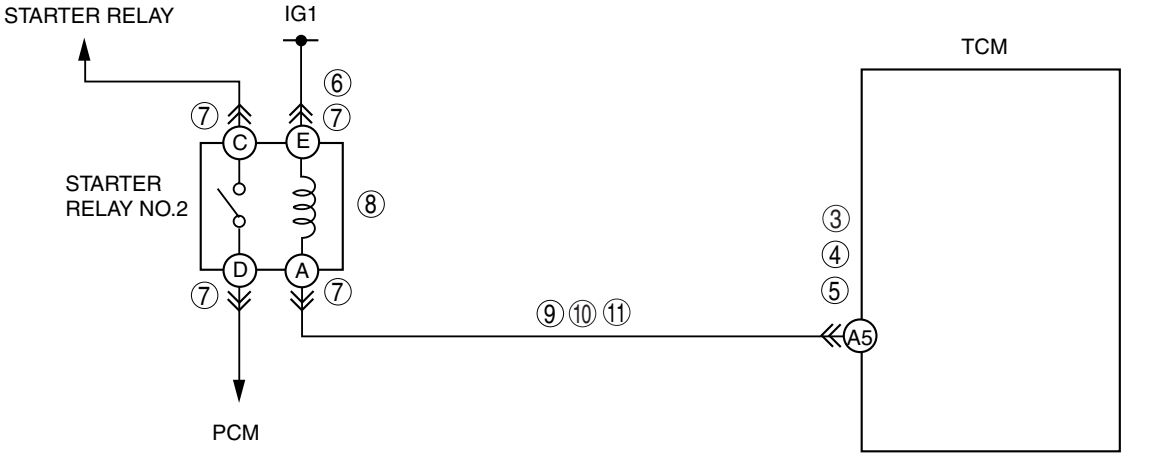
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT SOLENOID VALVE**<br>• Inspect the solenoid valve. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | **VERIFY TROUBLESHOOTING OF DTC P0780 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

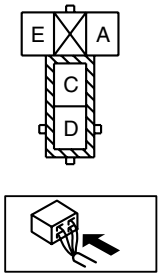
## DTC P0817[AW6A-EL, AW6AX-EL]

id050211802600

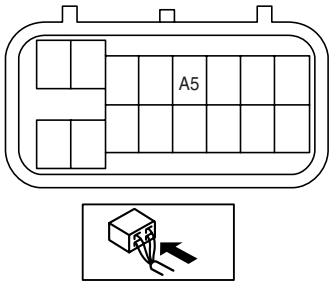
| DTC P0817 | Starter relay No.2 circuit malfunction (open circuit/short circuit) |
|---|---|
| DETECTION CONDITION | • Any of the following conditions are met when ignition switch is at ON position:<br>— 0 V detected at TCM terminal A5 when in D range or R position<br>— 12 V detected at TCM terminal A5 when in P or N position<br>**Diagnostic support note:**<br>• The MIL does not illuminate if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit between starter relay No.2 terminal A and TCM terminal A5<br>• Short to ground in wiring harness between starter relay No.2 terminal A and TCM terminal A5<br>• Short to power in wiring harness between starter relay No.2 terminal A and TCM terminal A5<br>• Starter relay No.2 malfunction<br>• Damaged connector between starter relay No.2 and TCM<br>• TCM malfunction |




STARTER RELAY NO.2 WIRING HARNESS-SIDE CONNECTOR




TCM WIRING HARNESS-SIDE CONNECTOR




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

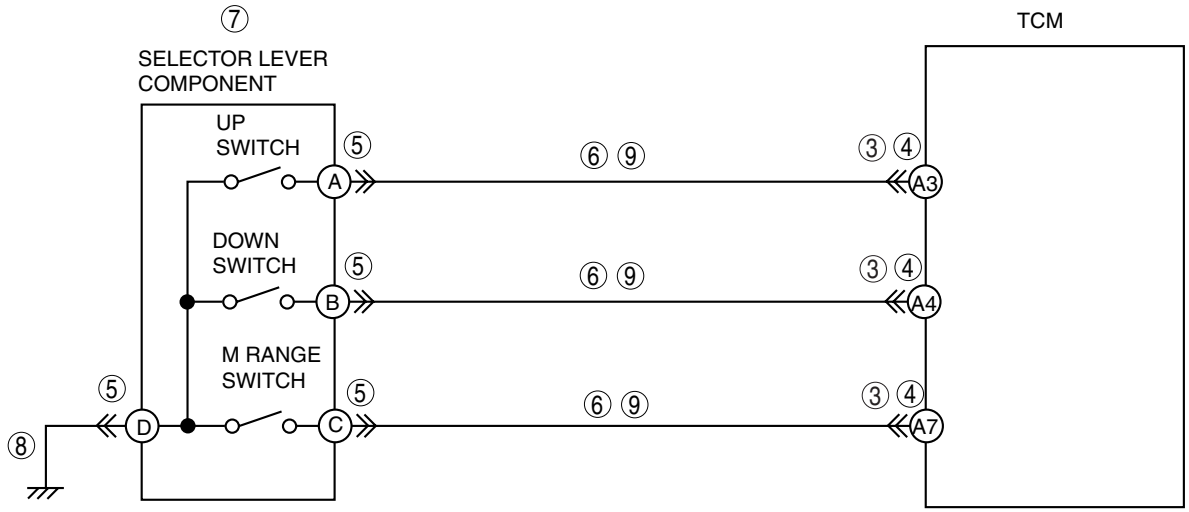
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT VOLTAGE OF STARTER RELAY NO.2 CIRCUIT**<br>• Turn the ignition switch to the ON position (engine off).<br>• Shift the selector lever to P or N position.<br>• Inspect for voltage TCM connector terminal A5 (wiring harness-side).<br>• Is the voltage **0 V**? | Yes | Go to go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT TCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the TCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to Step 12. |
| | | No | Replace the couple component, then go to Step 12. |
| 5 | **INSPECT VOLTAGE OF STARTER RELAY NO.2 CIRCUIT**<br>• Shift the selector lever to D range or R position.<br>• Inspect for voltage TCM connector terminal A5 (wiring harness-side).<br>• Is the voltage **B+**? | Yes | Go to go to Step 12. |
| | | No | Go to the next step. |
| 6 | **INSPECT VOLTAGE OF STARTER RELAY NO.2 TERMINAL E**<br>• Inspect for voltage starter relay No.2 terminal E (wiring harness-side).<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness, then go to Step 12. |
| 7 | **INSPECT STARTER RELAY NO.2 FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the starter relay No.2 connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 12. |
| 8 | **INSPECT STARTER RELAY NO.2**<br>• Inspect the starter relay No.2. (See 09-21-4 RELAY INSPECTION)<br>• Is the relay normal? | Yes | Go to the next step. |
| | | No | Replace the starter relay No.2, then go to Step 12. |
| 9 | **INSPECT STARTER RELAY NO.2 CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between TCM connector terminal A5 and starter relay No.2 terminal A (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the harness, then go to Step 12. |
| 10 | **INSPECT STARTER RELAY NO.2 CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between starter relay No.2 terminal A (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Repair or replace the harness, then go to Step 12. |
| | | No | Go to the next step. |
| 11 | **INSPECT STARTER RELAY NO.2 CIRCUIT FOR SHORT TO POWER**<br>• Turn the ignition switch to the ON position (engine off).<br>• Inspect the voltage at starter relay No.2 terminal A (wiring harness-side).<br>• Is the voltage **0 V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness, then go to Step 12. |
| 12 | **VERIFY TROUBLESHOOTING OF DTC P0817 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 13 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

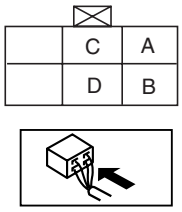
### DTC P0819[AW6A-EL, AW6AX-EL]

id050211802700

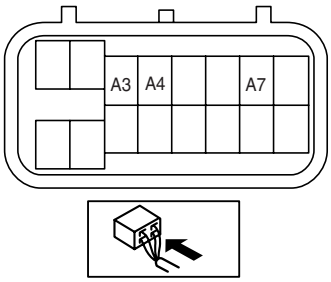
| DTC P0819 | Manual switch/up switch/down switch circuit malfunction (open circuit/short circuit) |
|---|---|
| DETECTION CONDITION | • Any of the following conditions are detected for **10 s or more** when engine is running:<br>— **5 V** detected at TCM terminals A7 when in any position except D or M range.<br>— **0 V** detected at TCM terminal A7 when **5 V** are input to TCM terminal A3 or A4.<br>**Diagnostic support note:**<br>• The MIL does not illuminate if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • M range switch malfunction<br>• Up switch malfunction<br>• Down switch malfunction.<br>• Open circuit in wiring harness between selector lever component terminal A and TCM terminal A3<br>• Open circuit in wiring harness between selector lever component terminal B and TCM terminal A4<br>• Open circuit in wiring harness between selector lever component terminal C and TCM terminal A7<br>• Open circuit in wiring harness between selector lever component terminal D and ground<br>• Short to ground in wiring harness between selector lever component terminal A and TCM terminal A3<br>• Short to ground in wiring harness between selector lever component terminal B and TCM terminal A4<br>• Short to ground in wiring harness between selector lever component terminal C and TCM terminal A7<br>• Damaged connector between selector lever component and TCM<br>• TCM malfunction |




SELECTOR LEVER COMPONENT WIRING HARNESS-SIDE CONNECTOR




TCM WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

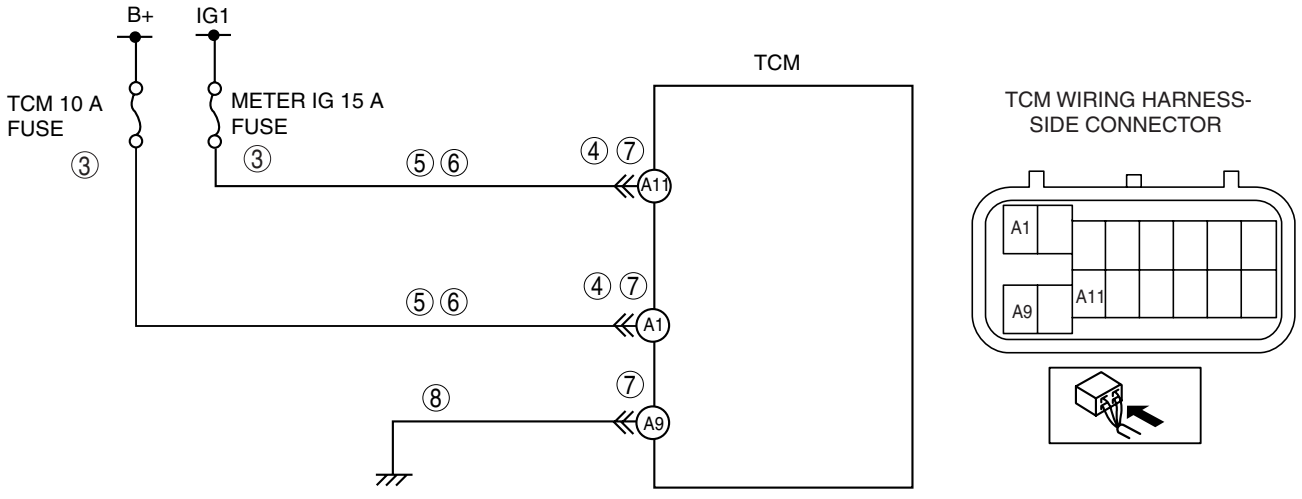
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT VOLTAGE OF M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT**<br>• Turn the ignition switch to the ON position. (engine off)<br>• Shift the selector lever to any except M range.<br>• Inspect for voltage between TCM connector terminals (wiring harness-side)<br>— Terminal A7 and ground (M range switch)<br>— Terminal A3 and ground (up switch)<br>— Terminal A4 and ground (down switch)<br>• Is the voltage **B+**? | Yes | Go to go to Step 10. |
| | | No | Go to the next step. |
| 4 | **INSPECT TCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the TCM connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 10. |
| 5 | **INSPECT SELECTOR LEVER COMPONENT FOR POOR CONNECTION**<br>• Disconnect the selector lever component connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 10. |
| 6 | **INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between selector lever component terminals (wiring harness-side) and body ground.<br>— Terminal C and body ground (M range switch)<br>— Terminal A and body ground (up switch)<br>— Terminal B and body ground (down switch)<br>• Is there continuity? | Yes | Repair or replace the harness, then go to Step 10. |
| | | No | Go to the next step. |
| 7 | **INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH**<br>• Inspect the M range switch, up switch, and down switch. (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION)<br>• Are the switches normal? | Yes | Go to the next step. |
| | | No | Replace the selector lever, then go to Step 10. (See 05-18-7 SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION.) |
| 8 | **INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between selector lever component terminal D (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the harness, then go to Step 10. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | **INSPECT M RANGE SWITCH, UP SWITCH, AND DOWN SWITCH CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between TCM connector terminals and selector lever component terminals (wiring harness-side).<br>— Terminal A7 and terminal C (M range switch)<br>— Terminal A3 and terminal A (up switch)<br>— Terminal A4 and terminal B (down switch)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the harness, then go to the next step. |
| 10 | **VERIFY TROUBLESHOOTING OF DTC P0819 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in M range, and change gears by shifting the selector lever (operating the up and down switches).<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 11 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

**DTC P0882[AW6A-EL, AW6AX-EL]**

id050211802800

| DTC P0882 | TCM B+ low |
|---|---|
| **DETECTION CONDITION** | • Voltage of less than **9 V** detected at TCM terminals A1 and A11 when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL does not illuminate if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light not illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • Melted METER IG 15 A fuse<br>• Melted TCM 10 A fuse<br>• Open circuit in wiring harness between TCM 10 A fuse and TCM terminal A1<br>• Open circuit in wiring harness between METER IG 15 A fuse and TCM terminal A11<br>• Open circuit in wiring harness between TCM terminal A9 and body ground<br>• Short to ground in wiring harness between TCM 10 A fuse and TCM terminal A1<br>• Short to ground in wiring harness between ROOM 15 A fuse and TCM terminal A11<br>• Poor connection of TCM connector<br>• TCM malfunction |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUSE**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect METER IG 15 A fuse and TCM 10 A fuse for malfunction.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | • If fuse has been melted, go to the next step.<br>• If fuse is not installed correctly, install it correctly, then go to Step 9. |
| 4 | **INSPECT VOLTAGE OF POWER SUPPLY CIRCUIT**<br>• Turn the ignition switch to the ON position (engine off).<br>• Inspect for voltage TCM connector terminal A1 and A11 (wiring harness-side).<br>• Is the voltage **B+**? | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT POWER SUPPLY CIRCUIT FOR SHORT TO GROUND**<br>• Disconnect the positive battery cable.<br>• Inspect for continuity between the fuse terminals and body ground.<br>— ROOM 15 A fuse terminal and body ground<br>— TCM 10 A fuse terminal and body ground<br>• Is there continuity? | Yes | Repair or replace the wiring harness and install new fuse, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between TCM connector terminals and fuse terminals (wiring harness-side).<br>— Terminal A1 and TCM 10 A fuse<br>— Terminal A11 and METER IG 15 A fuse<br>• Is there continuity? | Yes | Go to Step 8. |
| | | No | Repair or replace the harness, then go to Step 9. |
| 7 | **INSPECT TCM CONNECTOR FOR POOR CONNECTION**<br>• Disconnect the TCM connector.<br>• Inspect for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 9. |
| 8 | **INSPECT GROUND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between TCM connector terminal A9 (wiring harness-side) and body ground.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the harness, then go to Step 9. |
| 9 | **VERIFY TROUBLESHOOTING OF DTC P0882 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 10 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0883[AW6A-EL, AW6AX-EL]

id050211802900

| DTC P0883 | TCM B+ high |
|---|---|
| DETECTION CONDITION | • Voltage of **18 V or more** detected at TCM terminals A1 and A11 when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL does not illuminate if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light not illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Generator malfunction<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **VERIFY DTC**<br>• Turn the ignition switch to the LOCK position, then to the ON position.<br>• Verify the DTC in the PCM memory.<br>• Are DTC P2504 output? | Yes | Go to the applicable DTC inspection.<br>(See 01-02-13 DTC TABLE[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | **VERIFY TROUBLESHOOTING OF DTC P0883 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine and warm it up completely.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 5 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0942[AW6A-EL, AW6AX-EL]

id050211803000

| DTC P0942 | Valve control solenoid circuit malfunction at D range (valve stuck) |
|---|---|
| DETECTION CONDITION | • Difference of **less than 150 rpm** between engine and turbine speeds detected when following conditions are satisfied while driving:<br>**Monitoring condition:**<br>— Engine running<br>— Driving in D range<br>— Counter drive gear (output) revolution speed**500 rpm or more (VSS)**<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |

| DTC P0942 | Valve control solenoid circuit malfunction at D range (valve stuck) |
|---|---|
| POSSIBLE CAUSE | • Shift solenoid A stuck<br>• Shift solenoid B stuck<br>• Shift solenoid C stuck<br>• C1 clutch slipping<br>• Control valve stuck<br>• TCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 6.<br>Any ranges: Replace the control valve body, then go to Step 6.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go the Step 6.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT SOLENOID VALVE**<br>• Inspect the solenoid valve. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body, then go to the next step.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P0942 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0961[AW6A-EL, AW6AX-EL]

id050211803100

| DTC P0961 | Line pressure control solenoid range/performance (stuck) |
|---|---|
| DETECTION CONDITION | • Feedback current corresponding to solenoid current command value is irregular when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Line pressure control solenoid stuck<br>• Control valve stuck<br>• TCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is light red or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | • All ranges: Replace the oil pump or control valve body, then go to the next step.<br>• Any ranges: Replace the ATX, then go the next step.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT LINE PRESSURE CONTROL SOLENOID**<br>• Inspect the line pressure control solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0961 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

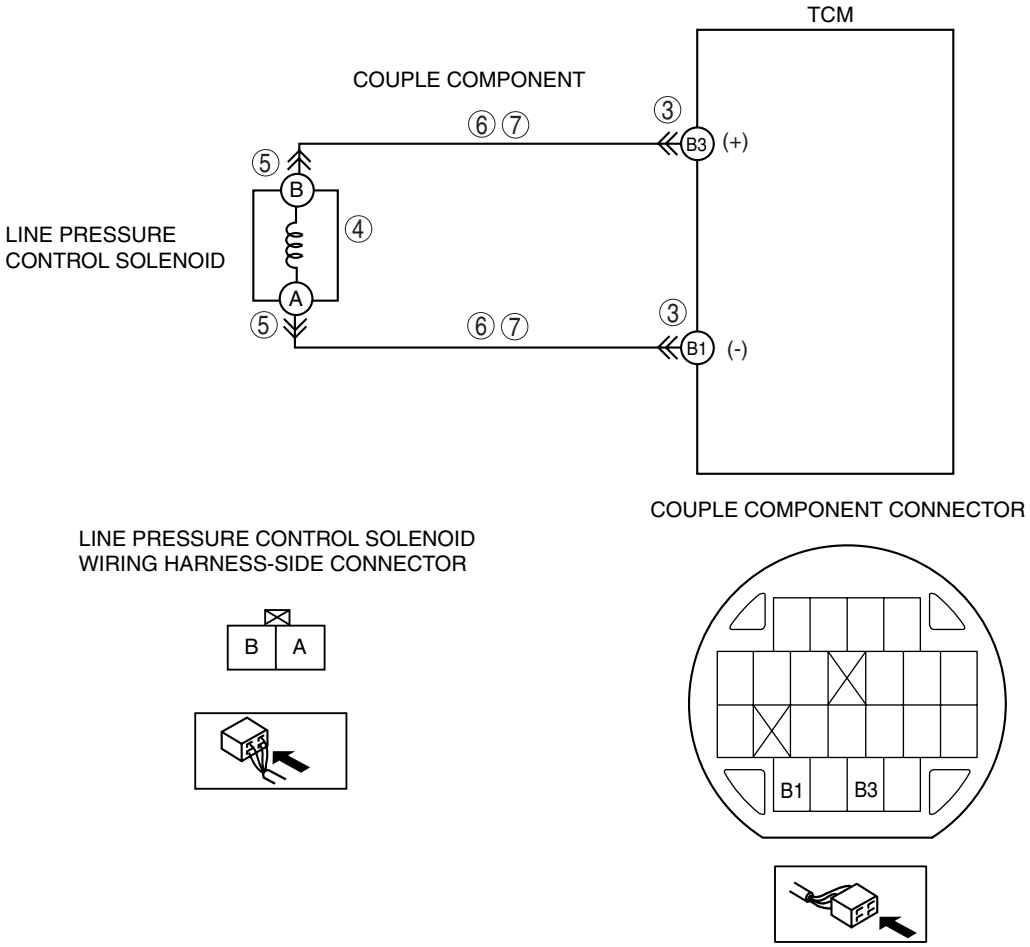
## DTC P0962[AW6A-EL, AW6AX-EL]

id050211803200



| DTC P0962 | Line pressure control solenoid circuit malfunction (short to ground/open circuit) |
|---|---|
| **DETECTION CONDITION** | • Open or short circuit in line pressure control solenoid signal system (The solenoid circuit current value input to the TCM is continuously **less than 23 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • Open circuit between line pressure control solenoid terminal B and TCM terminal B3<br>• Open circuit between line pressure control solenoid terminal A and TCM terminal B1<br>• Short to ground in wiring harness between line pressure control solenoid terminal B and TCM terminal B3<br>• Short to ground in wiring harness between line pressure control solenoid terminal A and TCM terminal B1<br>• Line pressure control solenoid malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |

| DTC P0962 | Line pressure control solenoid circuit malfunction (short to ground/open circuit) |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF LINE PRESSURE CONTROL SOLENOID CIRCUIT**<br>• Inspect for resistance between couple component terminals B3 and B1 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT TERMINAL LINE PRESSURE CONTROL SOLENOID FOR POOR CONNECTION**<br>• Disconnect the line pressure control solenoid connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals and line pressure control solenoid terminals (wiring harness-side).<br>— Terminal B3 and terminal B<br>— Terminal B1 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B3 and all terminals except B3/B1<br>— Terminal B1 and all terminals except B3/B1<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0962 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

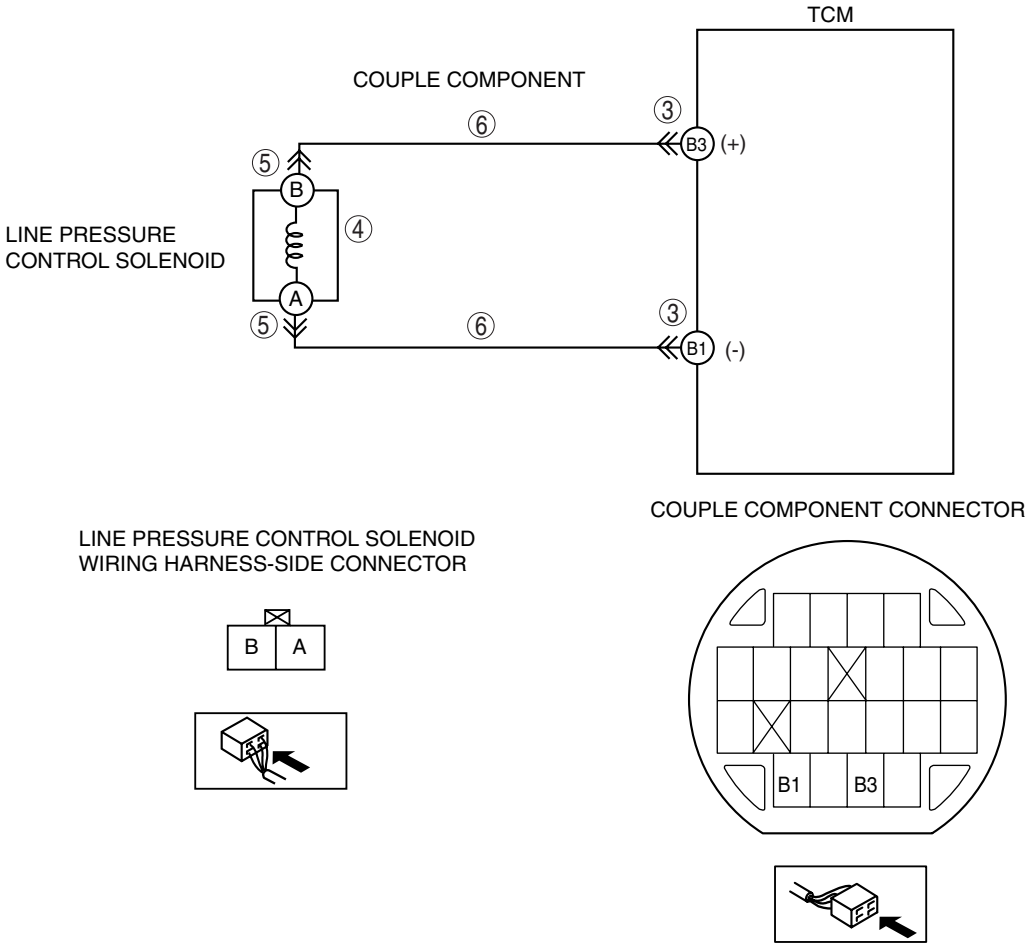


### DTC P0963[AW6A-EL, AW6AX-EL]

id050211803300

| DTC P0963 | Line pressure control solenoid circuit malfunction (short to power) |
|---|---|
| DETECTION CONDITION | • Short circuit in line pressure control solenoid signal system (The solenoid circuit current value input to the TCM is continuously **more than 1,333 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to power in wiring harness between line pressure control solenoid terminal B and TCM terminal B3<br>• Short to power in wiring harness between line pressure control solenoid terminal A and TCM terminal B1<br>• Line pressure control solenoid malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |

| DTC P0963 | Line pressure control solenoid circuit malfunction (short to power) |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF LINE PRESSURE CONTROL SOLENOID CIRCUIT**<br>• Inspect for resistance between couple component terminals B3 and B1 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT TERMINAL LINE PRESSURE CONTROL SOLENOID FOR POOR CONNECTION**<br>• Disconnect the line pressure control solenoid connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B3 and all terminals except B3/B1<br>— Terminal B1 and all terminals except B3/B1<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0963 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

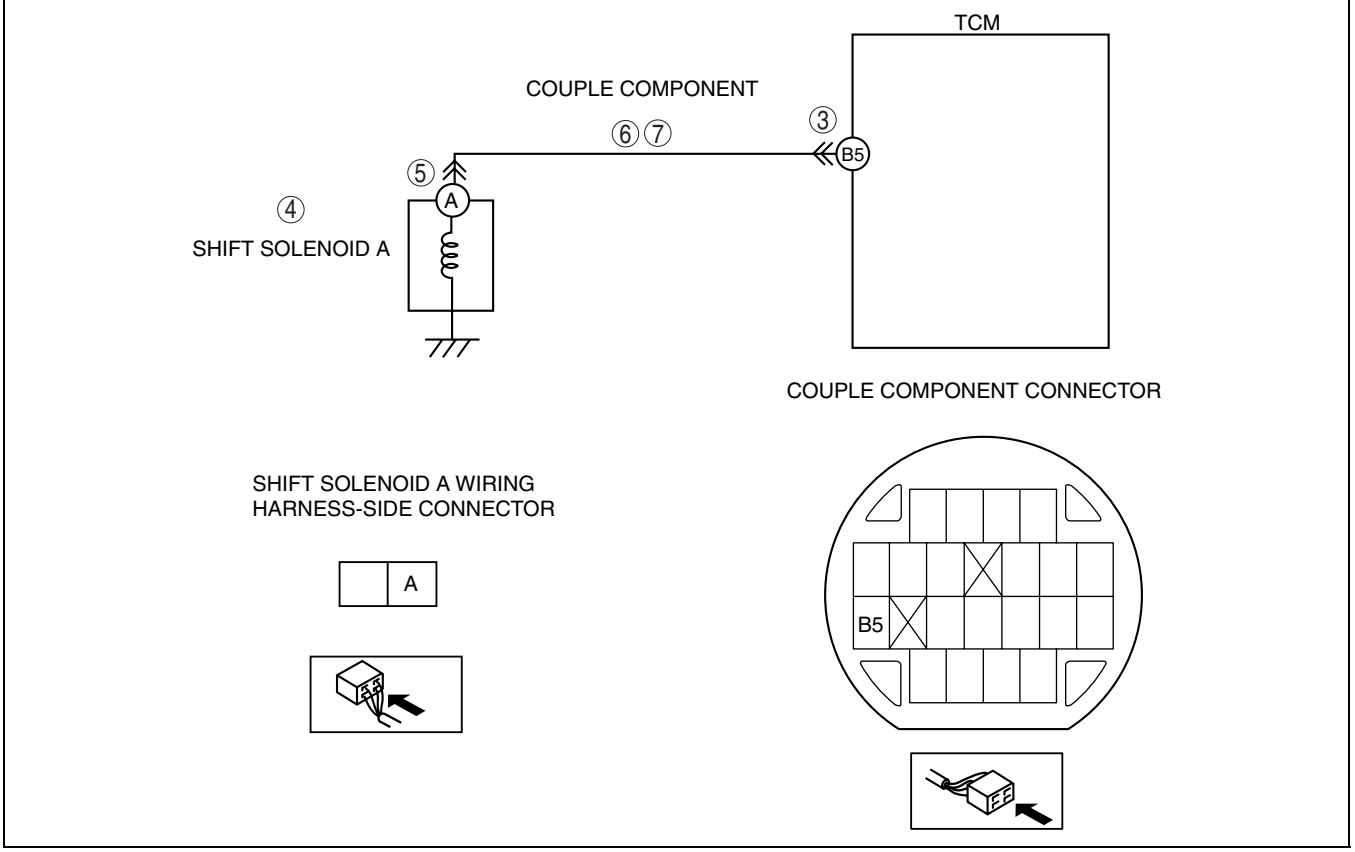


### DTC P0973[AW6A-EL, AW6AX-EL]

id050211803400

| DTC P0973 | Shift solenoid A circuit malfunction (short to ground) |
|---|---|
| DETECTION CONDITION | • Short to ground in shift solenoid A signal system (The solenoid remains off continuously for **100 ms or more** even if the TCM sends a solenoid on command).<br>**Diagnostic support note:**<br>• This is continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to ground in wiring harness between shift solenoid A terminal A and TCM terminal B5<br>• Shift solenoid A malfunction<br>• Damaged connector between shift solenoid A and TCM<br>• TCM malfunction |

| DTC P0973 | Shift solenoid A circuit malfunction (short to ground) |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID A CIRCUIT**<br>• Inspect for resistance between couple component terminal B5 (wiring harness-side) and ground.<br>• Is resistance **within 11— 15 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID A FOR POOR CONNECTION**<br>• Disconnect the shift solenoid A connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminal B5 and all terminals except B5 (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0973 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

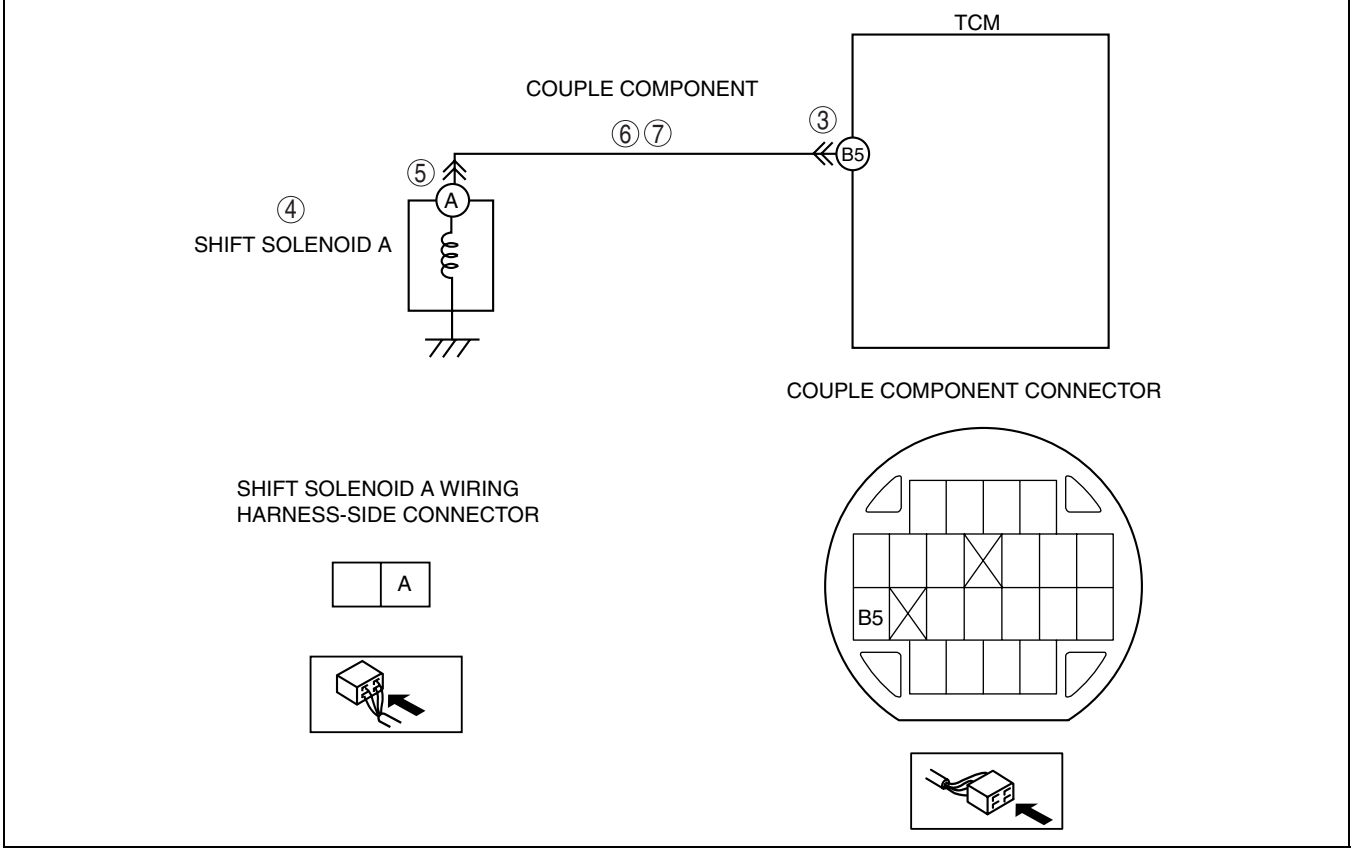


### DTC P0974[AW6A-EL, AW6AX-EL]

id050211803500

| DTC P0974 | Shift solenoid A circuit malfunction (short to power/open circuit) |
|---|---|
| **DETECTION CONDITION** | • Open or short circuit in shift solenoid A signal system (The solenoid remains on continuously for **100 ms or more** even if the TCM sends a solenoid off command).<br>**Diagnostic support note:**<br>• This is continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • Open circuit in wiring harness between shift solenoid A terminal A and TCM terminal B5<br>• Short to power in wiring harness between shift solenoid A terminal A and TCM terminal B5<br>• Shift solenoid A malfunction<br>• Damaged connector between shift solenoid A and TCM<br>• TCM malfunction |

| DTC P0974 | Shift solenoid A circuit malfunction (short to power/open circuit) |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID A CIRCUIT**<br>• Inspect for resistance between couple component terminal B5 (wiring harness-side) and ground.<br>• Is resistance **within 11— 15 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID A FOR POOR CONNECTION**<br>• Disconnect the shift solenoid A connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminal B5 (wiring harness-side) and shift solenoid A terminal A wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminal B5 and all terminals except B5 (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0974 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

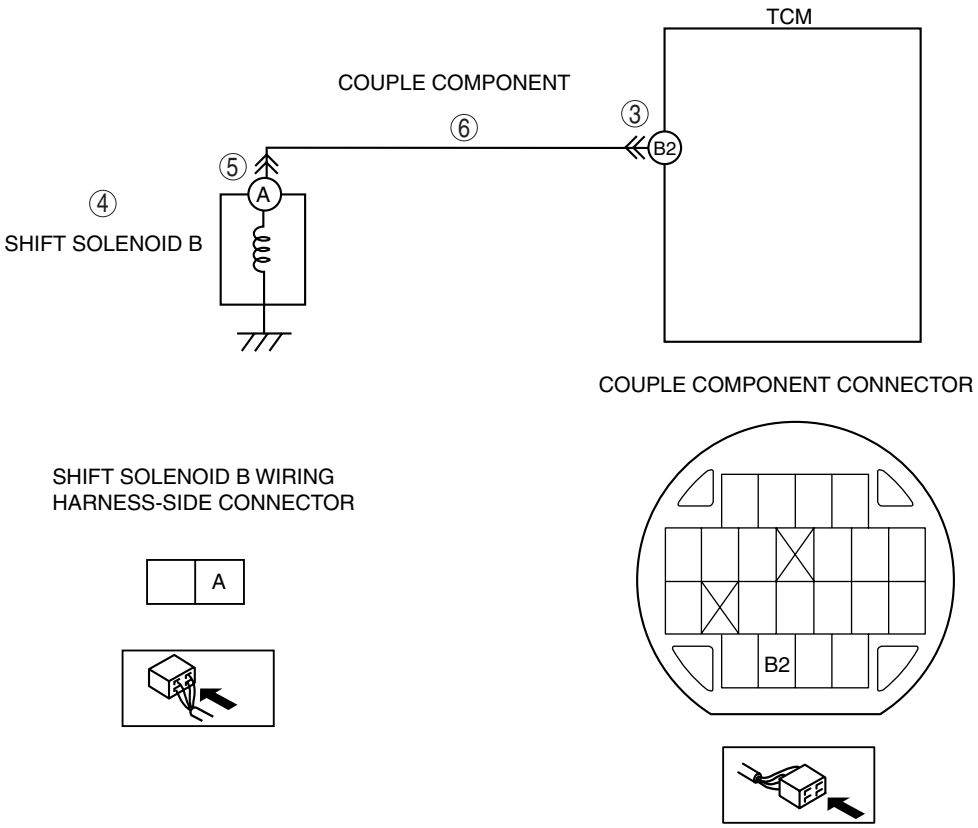


### DTC P0976[AW6A-EL, AW6AX-EL]

id050211803600

| DTC P0976 | Shift solenoid B circuit malfunction (short to ground) |
|---|---|
| **DETECTION CONDITION** | • Short to ground in shift solenoid B signal system (The solenoid remains off continuously for **100 ms or more** even if the TCM sends a solenoid on command).<br>**Diagnostic support note:**<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • Short to ground in wiring harness between shift solenoid B terminal A and TCM terminal B2<br>• Shift solenoid B malfunction<br>• Damaged connector between shift solenoid B and TCM<br>• TCM malfunction |

| DTC P0976 | Shift solenoid B circuit malfunction (short to ground) |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID B CIRCUIT**<br>• Inspect for resistance between couple component terminal B2 (wiring harness-side) and ground.<br>• Is resistance **within 11— 15 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT TERMINAL SHIFT SOLENOID B FOR POOR CONNECTION**<br>• Disconnect the shift solenoid B connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminal B2 and all terminals except B2 (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0976 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

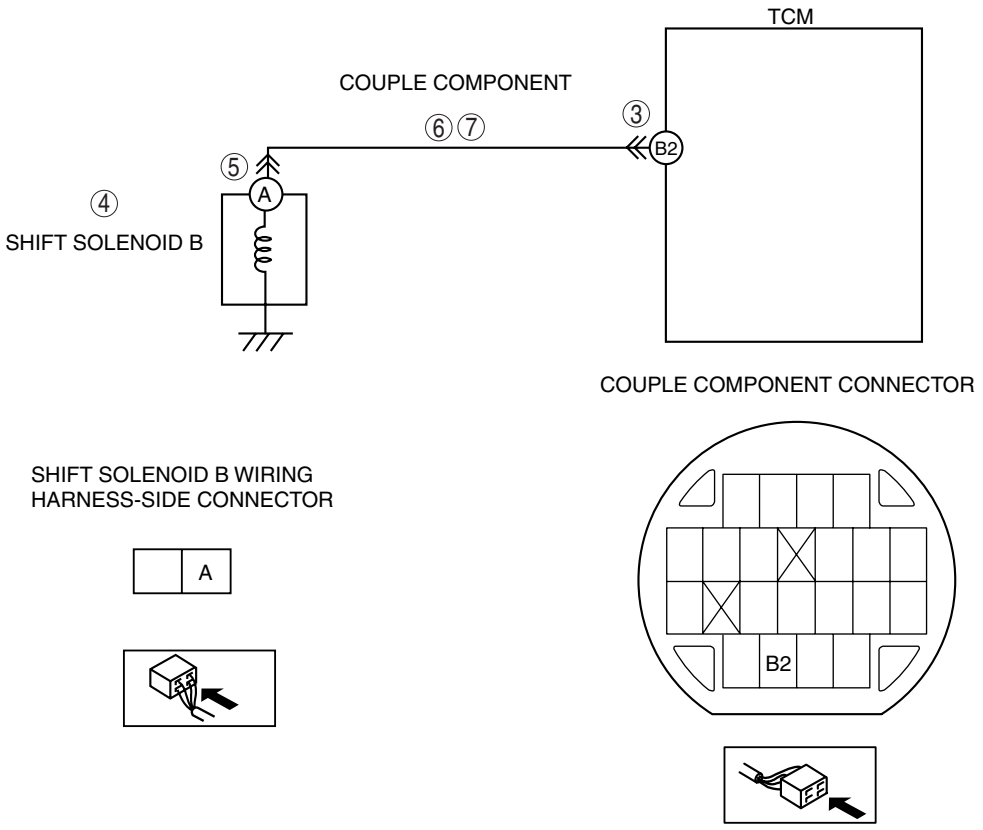


### DTC P0977[AW6A-EL, AW6AX-EL]

id050211803700

| DTC P0977 | Shift solenoid B circuit malfunction (short to power/open circuit) |
|---|---|
| DETECTION CONDITION | • Open or short circuit in shift solenoid B signal system (The solenoid remains on continuously for **100 ms or more** even if the TCM sends a solenoid off command).<br>**Diagnostic support note:**<br>• The MIL illuminates if the TCM detects the above malfunction condition during first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit in wiring harness between shift solenoid B terminal A and TCM terminal B2<br>• Short to power in wiring harness between shift solenoid B terminal A and TCM terminal B2<br>• Shift solenoid B malfunction<br>• Damaged connector between shift solenoid A and TCM<br>• TCM malfunction |

| DTC P0977 | Shift solenoid B circuit malfunction (short to power/open circuit) |
|---|---|




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID B CIRCUIT**<br>• Inspect for resistance between couple component terminal B2 (wiring harness-side) and ground.<br>• Is resistance **within 11— 15 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT TERMINAL SHIFT SOLENOID B FOR POOR CONNECTION**<br>• Disconnect the shift solenoid B connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminal B2 (wiring harness-side) and shift solenoid A terminal A wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminal B2 and all terminals except B2 (wiring harness-side).<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0977 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the WDS or equivalent.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |



### DTC P0978[AW6A-EL, AW6AX-EL]

id050211803800

| DTC P0978 | Shift solenoid C range/performance (stuck) |
|---|---|
| **DETECTION CONDITION** | • Feedback current corresponding to solenoid current command value is irregular when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| **POSSIBLE CAUSE** | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid C stuck<br>• Control valve stuck<br>• TCM malfunction |

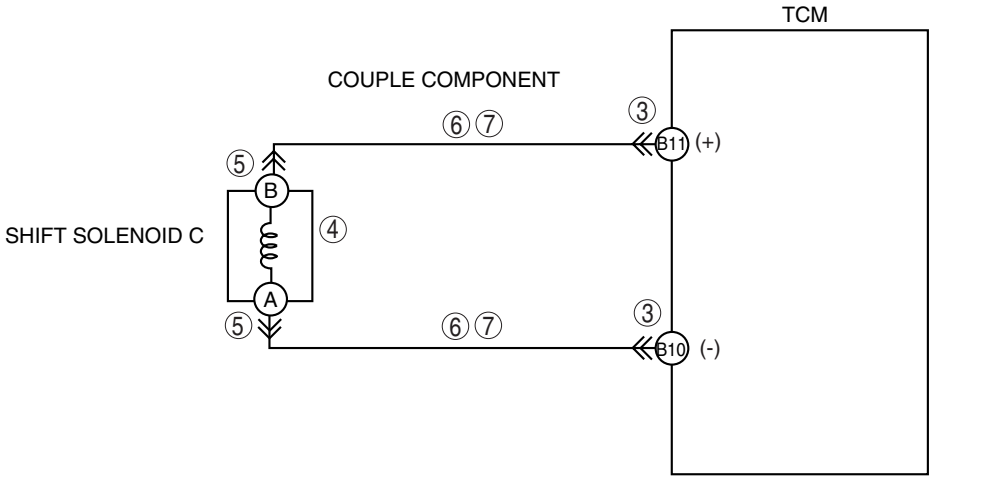
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is light red or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | • All ranges: Replace the oil pump or control valve body, then go to the next step.<br>• Any ranges: Replace the ATX, then go the next step.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0978 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0979[AW6A-EL, AW6AX-EL]

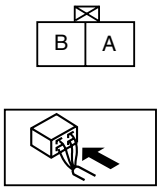
id050211803900

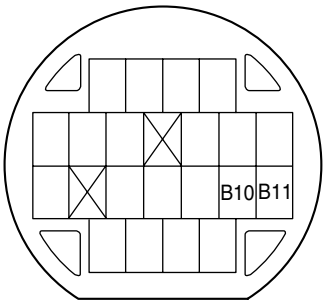
| DTC P0979 | Shift solenoid C circuit malfunction (short to ground/open circuit) |
|---|---|
| DETECTION CONDITION | • Open or short circuit in shift solenoid C signal system (The solenoid circuit current value input to the TCM is continuously **less than 23 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit between shift solenoid C terminal B and TCM terminal B11<br>• Open circuit between shift solenoid C terminal A and TCM terminal B10<br>• Short to ground in wiring harness between shift solenoid C terminal B and TCM terminal B11<br>• Short to ground in wiring harness between shift solenoid C terminal A and TCM terminal B10<br>• Shift solenoid C malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |




COUPLE COMPONENT CONNECTOR

SHIFT SOLENOID C WIRING HARNESS-SIDE CONNECTOR



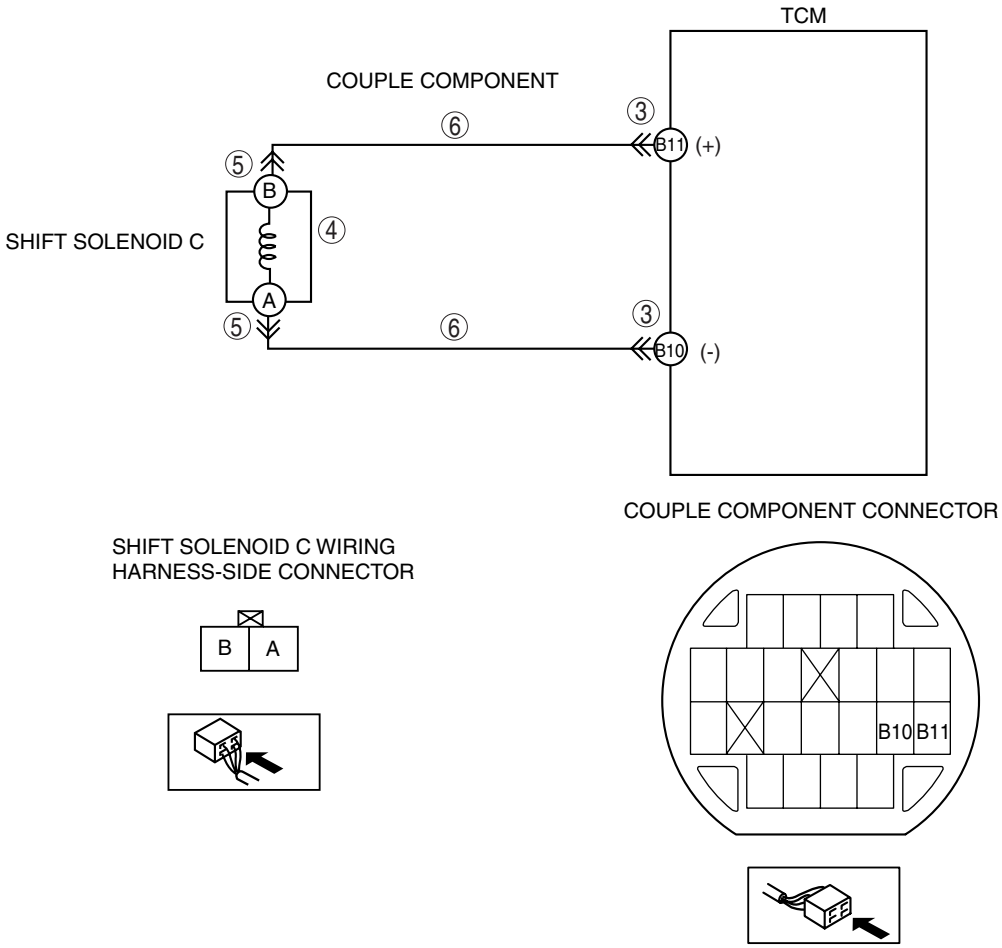
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID C CIRCUIT**<br>• Inspect for resistance between couple component terminals B11 and B10 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID C FOR POOR CONNECTION**<br>• Disconnect the shift solenoid C connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals and line pressure control solenoid terminals (wiring harness-side).<br>— Terminal B11 and terminal B<br>— Terminal B10 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B11 and all terminals except B11/ B10<br>— Terminal B10 and all terminals except B11/ B10<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0979 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0980[AW6A-EL, AW6AX-EL]

id050211804000

| DTC P0980 | Shift solenoid C circuit malfunction (short to power) |
|---|---|
| DETECTION CONDITION | • Short circuit in shift solenoid C signal system (The solenoid circuit current value input to the TCM is continuously **more than 1,333 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to power in wiring harness between shift solenoid C terminal B and TCM terminal B11<br>• Short to power in wiring harness between shift solenoid C terminal A and TCM terminal B10<br>• Shift solenoid C malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID C CIRCUIT**<br>• Inspect for resistance between couple component terminals B11 and B10 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID C FOR POOR CONNECTION**<br>• Disconnect the shift solenoid C connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B11 and all terminals except B11/ B10<br>— Terminal B10 and all terminals except B11/ B10<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0980 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0981[AW6A-EL, AW6AX-EL]

id050211804100

| DTC P0981 | Shift solenoid D range/performance (stuck) |
|---|---|
| DETECTION CONDITION | • Feedback current corresponding to solenoid current command value is irregular when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid D stuck<br>• Control valve stuck<br>• TCM malfunction |

### Diagnostic procedure



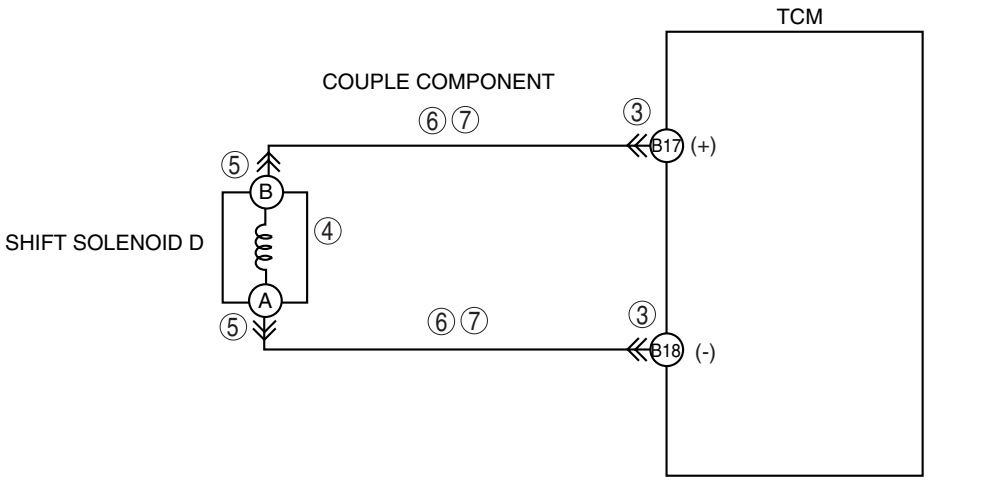
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is light red or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | • All ranges: Replace the oil pump or control valve body, then go to the next step.<br>• Any ranges: Replace the ATX, then go the next step.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0981 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |

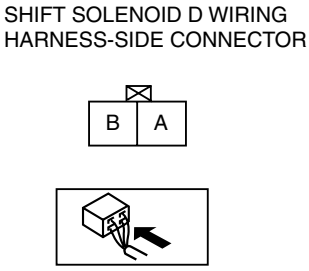
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

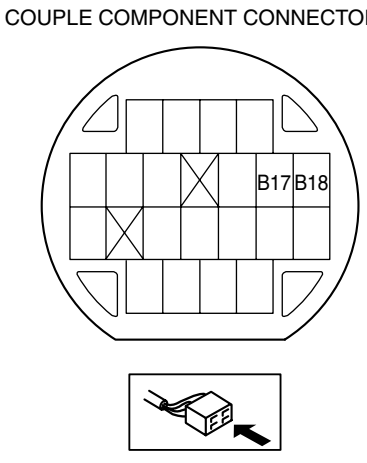
### DTC P0982[AW6A-EL, AW6AX-EL]

id050211804200

| DTC P0982 | Shift solenoid D circuit malfunction (short to ground/open circuit) |
|---|---|
| DETECTION CONDITION | • Open or short circuit in shift solenoid D signal system (The solenoid circuit current value input to the TCM is continuously **less than 23 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit between shift solenoid D terminal B and TCM terminal B17<br>• Open circuit between shift solenoid D terminal A and TCM terminal B18<br>• Short to ground in wiring harness between shift solenoid D terminal B and TCM terminal B17<br>• Short to ground in wiring harness between shift solenoid D terminal A and TCM terminal B18<br>• Shift solenoid D malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



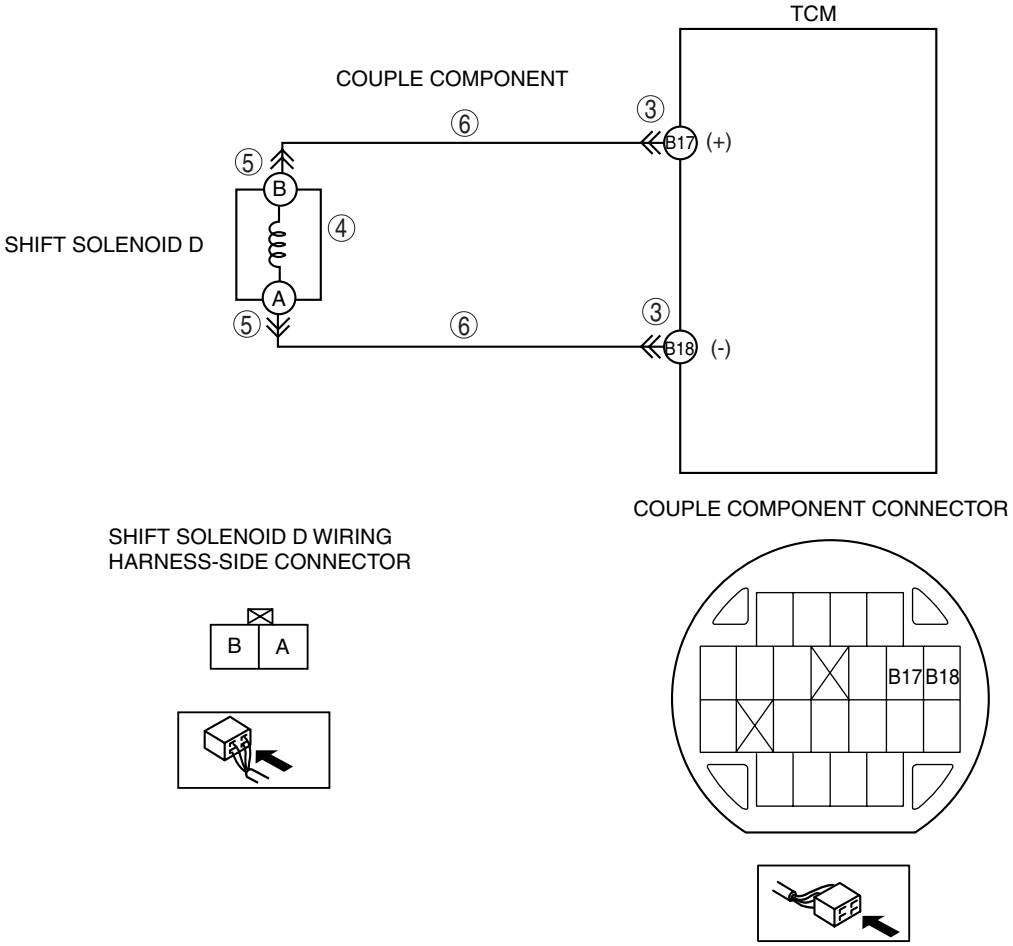
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID D CIRCUIT**<br>• Inspect for resistance between couple component terminals B17 and B18 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID D FOR POOR CONNECTION**<br>• Disconnect the shift solenoid D connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals and line pressure control solenoid terminals (wiring harness-side).<br>— Terminal B17 and terminal B<br>— Terminal B18 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B17 and all terminals except B17/ B18<br>— Terminal B18 and all terminals except B17/ B18<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0982 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0983[AW6A-EL, AW6AX-EL]

id050211804300

| DTC P0983 | Shift solenoid D circuit malfunction (short to power) |
|---|---|
| DETECTION CONDITION | • Short circuit in shift solenoid D signal system (The solenoid circuit current value input to the TCM is continuously **more than 1,333 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to power in wiring harness between shift solenoid D terminal B and TCM terminal B17<br>• Short to power in wiring harness between shift solenoid D terminal A and TCM terminal B18<br>• Shift solenoid D malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID D CIRCUIT**<br>• Inspect for resistance between couple component terminals B17 and B18 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID D FOR POOR CONNECTION**<br>• Disconnect the shift solenoid D connector.<br>• Inspect for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B17 and all terminals except B17/B18<br>— Terminal B18 and all terminals except B17/B18<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0983 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0984[AW6A-EL, AW6AX-EL]

id050211804400

| DTC P0984 | Shift solenoid E range/performance (stuck) |
|---|---|
| DETECTION CONDITION | • Feedback current corresponding to solenoid current command value is irregular when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid E stuck<br>• Control valve stuck<br>• TCM malfunction |

### Diagnostic procedure

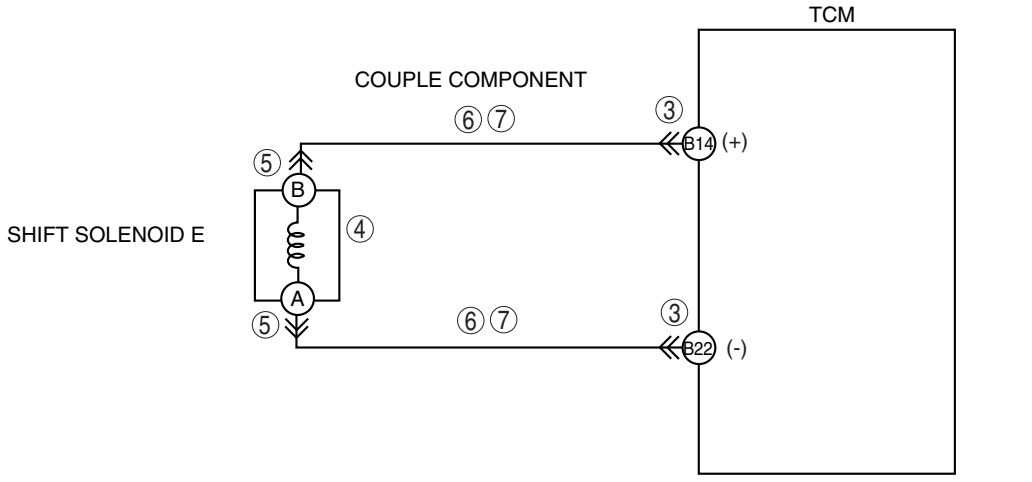
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is light red or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | • All ranges: Replace the oil pump or control valve body, then go to the next step.<br>• Any ranges: Replace the ATX, then go the next step.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0984 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |

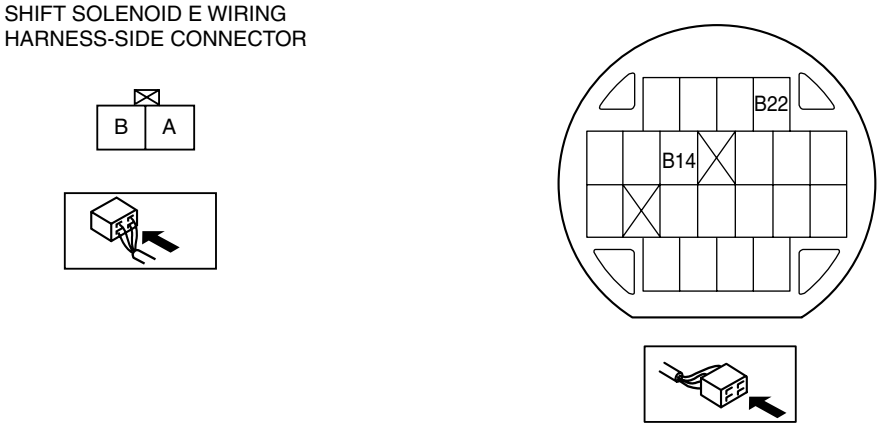
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0985[AW6A-EL, AW6AX-EL]

id050211804500

| DTC P0985 | Shift solenoid E circuit malfunction (short to ground/open circuit) |
|---|---|
| DETECTION CONDITION | • Open or short circuit in shift solenoid E signal system (The solenoid circuit current value input to the TCM is continuously **less than 23 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit between shift solenoid E terminal B and TCM terminal B14<br>• Open circuit between shift solenoid E terminal A and TCM terminal B22<br>• Short to ground in wiring harness between shift solenoid E terminal B and TCM terminal B14<br>• Short to ground in wiring harness between shift solenoid E terminal A and TCM terminal B22<br>• Shift solenoid E malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



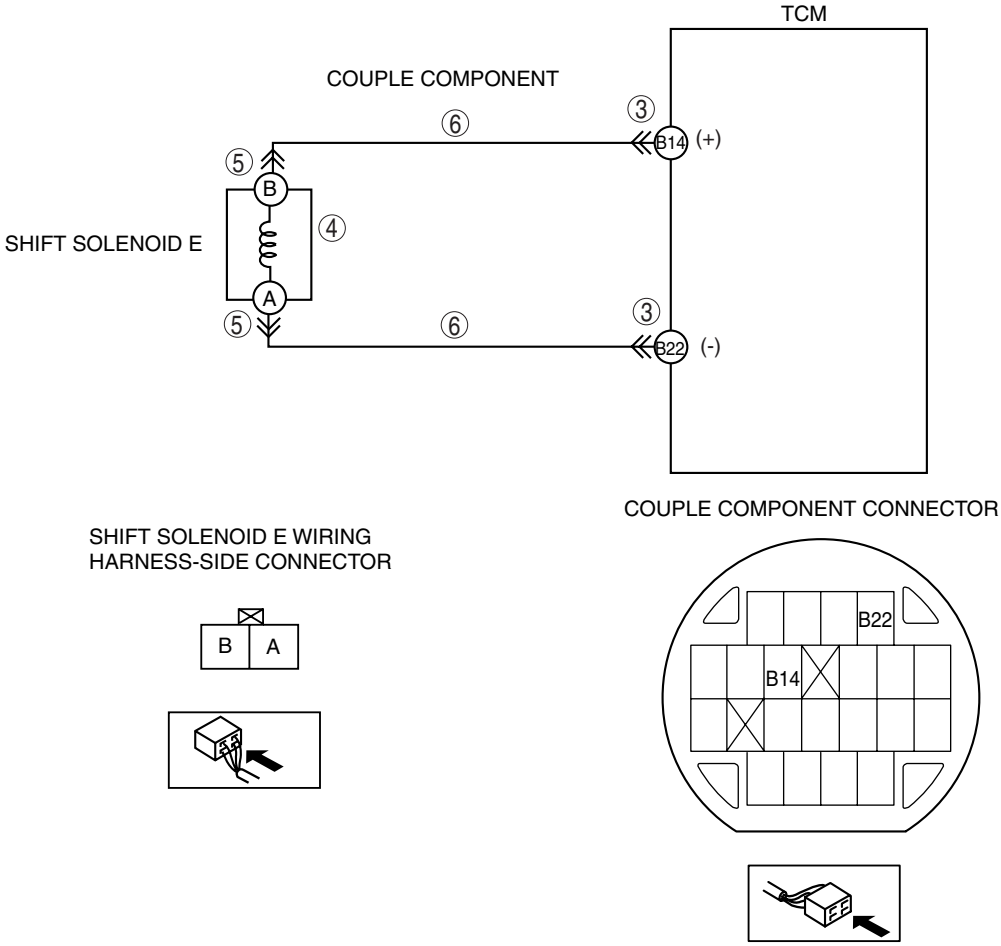
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID E CIRCUIT**<br>• Inspect for resistance between couple component terminals B14 and B22 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID E FOR POOR CONNECTION**<br>• Disconnect the shift solenoid E connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals and line pressure control solenoid terminals (wiring harness-side).<br>— Terminal B14 and terminal B<br>— Terminal B22 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B14 and all terminals except B14/ B22<br>— Terminal B22 and all terminals except B14/ B22<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0985 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0986[AW6A-EL, AW6AX-EL]

id050211804600

| DTC P0986 | Shift solenoid E circuit malfunction (short to power) |
|---|---|
| DETECTION CONDITION | • Short circuit in shift solenoid E signal system (The solenoid circuit current value input to the TCM is continuously **more than 1,333 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to power in wiring harness between shift solenoid E terminal B and TCM terminal B14<br>• Short to power in wiring harness between shift solenoid E terminal A and TCM terminal B22<br>• Shift solenoid E malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID E CIRCUIT**<br>• Inspect for resistance between couple component terminals B14 and B22 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID E FOR POOR CONNECTION**<br>• Disconnect the shift solenoid E connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B14 and all terminals except B14/ B22<br>— Terminal B22 and all terminals except B14/ B22<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0986 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0997[AW6A-EL, AW6AX-EL]

id050211804700

| DTC P0997 | Shift solenoid F range/performance (stuck) |
|---|---|
| DETECTION CONDITION | • Feedback current corresponding to solenoid current command value is irregular when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• Shift solenoid F stuck<br>• Control valve stuck<br>• TCM malfunction |

### Diagnostic procedure



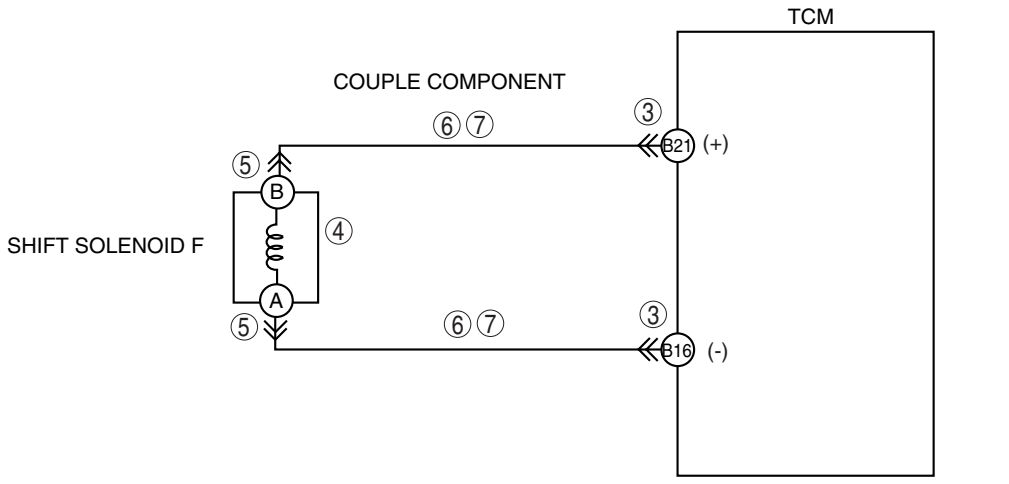
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is light red or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | • All ranges: Replace the oil pump or control valve body, then go to the next step.<br>• Any ranges: Replace the ATX, then go the next step.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT SHIFT SOLENOID**<br>• Inspect the shift solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0997 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P0998[AW6A-EL, AW6AX-EL]

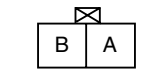
id050211804800

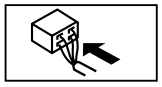
| DTC P0998 | Shift solenoid F circuit malfunction (short to ground/open circuit) |
|---|---|
| DETECTION CONDITION | • Open or short circuit in shift solenoid F signal system (The solenoid circuit current value input to the TCM is continuously **less than 23 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit between shift solenoid F terminal B and TCM terminal B21<br>• Open circuit between shift solenoid F terminal A and TCM terminal B16<br>• Short to ground in wiring harness between shift solenoid F terminal B and TCM terminal B21<br>• Short to ground in wiring harness between shift solenoid F terminal A and TCM terminal B16<br>• Shift solenoid F malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |

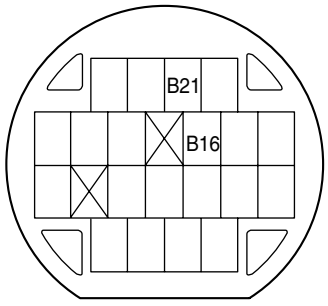


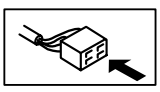

COUPLE COMPONENT CONNECTOR

SHIFT SOLENOID F WIRING HARNESS-SIDE CONNECTOR





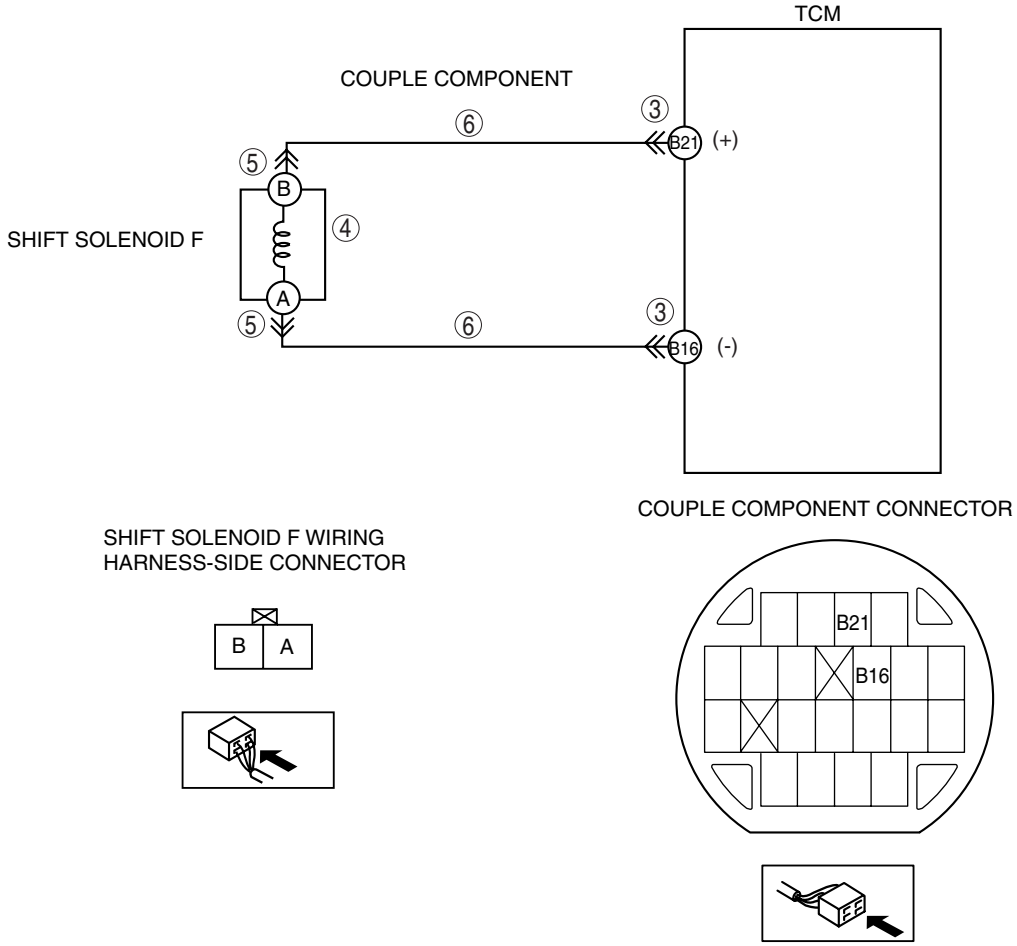
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID F CIRCUIT**<br>• Inspect for resistance between couple component terminals B21 and B16 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID F FOR POOR CONNECTION**<br>• Disconnect the shift solenoid F connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals and line pressure control solenoid terminals (wiring harness-side).<br>— Terminal B21 and terminal B<br>— Terminal B16 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B21 and all terminals except B21/ B16<br>— Terminal B16 and all terminals except B21/ B16<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P0998 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P0999[AW6A-EL, AW6AX-EL]

id050211804900

| DTC P0999 | Shift solenoid F circuit malfunction (short to power) |
|---|---|
| DETECTION CONDITION | • Short circuit in shift solenoid F signal system (The solenoid circuit current value input to the TCM is continuously **more than 1,333 mA** for **100 ms or more**).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to power in wiring harness between shift solenoid F terminal B and TCM terminal B21<br>• Short to power in wiring harness between shift solenoid F terminal A and TCM terminal B16<br>• Shift solenoid F malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF SHIFT SOLENOID F CIRCUIT**<br>• Inspect for resistance between couple component terminals B21 and B16 (wiring harness-side).<br>• Is resistance**within 5.0— 5.6 ohms?** (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL SHIFT SOLENOID F FOR POOR CONNECTION**<br>• Disconnect the shift solenoid F connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B21 and all terminals except B21/ B16<br>— Terminal B16 and all terminals except B21/ B16<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P0999 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P1700[AW6A-EL, AW6AX-EL]

id050211805000

| DTC P1700 | Valve control solenoid circuit malfunction at R range (valve stuck) |
|---|---|
| DETECTION CONDITION | • When all of the following conditions are met while driving in R position and the counter drive gear (output} speed is **500 rpm or less:**<br>— The difference between the engine and turbine shaft speeds is **less than 150 rpm**<br>— The turbine shaft speed is more than the estimated turbine speed value, as derived from the counter drive gear (output) speed, plus **200 rpm.**<br>**Diagnostic support note:**<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Shift solenoid A stuck<br>• Shift solenoid B stuck<br>• Shift solenoid E stuck<br>• C3 clutch slipping<br>• B2 brake slipping<br>• Control valve stuck<br>• TCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 6.<br>Any ranges: Replace the control valve body, then go to Step 6.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT STALL SPEED**<br>• Measure the stall speed in D range. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Is the stall speed within the specification? | Yes | Go to the next step. |
| | | No | Replace the automatic transaxle, then go the Step 6.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT SOLENOID VALVE**<br>• Inspect the solenoid valve. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body, then go to the next step.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **VERIFY TROUBLESHOOTING OF DTC P1700 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in R position.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 7 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P2757[AW6A-EL, AW6AX-EL]

id050211805100

| DTC P2757 | Torque converter clutch (TCC) stuck off |
|---|---|
| DETECTION CONDITION | • When all conditions below are satisfied.<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in 4GR— 6GR at D range<br>— Engine running<br>— Torque converter clutch (TCC) operating<br>— Difference between engine speed and Counter drive gear (output) revolution speed (VSS) **100 rpm or more**<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• TCC control solenoid stuck<br>• Line pressure low<br>• Control valve stuck.<br>• Torque converter malfunction<br>• TCM malfunction |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is milky or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 7.<br>Any ranges: Replace the control valve body, then go to Step 6.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT TCC CONTROL SOLENOID**<br>• Inspect the TCC control solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Replace the Torque converter, then go to the next step.<br>(See 05-17-46 TORQUE CONVERTER REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the control valve body, then go to the next step.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2757 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine.<br>• Warm up engine and ATX.<br>• Drive the vehicle under the following conditions for**2 s or more.**<br>— ATF temperature (TFT PID): **20 °C {68 °F} or more**<br>— Drive in the D range, 4GR— 6GR (TCC operation)<br>• Are any DTCs present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

### DTC P2758[AW6A-EL, AW6AX-EL]

id050211805200

| DTC P2758 | Torque converter clutch (TCC) stuck on |
|---|---|
| **DETECTION CONDITION** | • All of the following conditions are satisfied under each of the following accelerator conditions.<br>— ATF temperature **20 °C {68 °F} or more**<br>— Driving in D range<br>— Engine running<br>— Engine speed **within 1,000— 3,000rpm**<br>— Torque converter clutch (TCC) no operating<br>— Difference between engine speed and turbine revolution speed **less than 30 rpm**<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL does not illuminate if PCM detects the above malfunction conditions during first the drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is not available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the PCM memory. |
| **POSSIBLE CAUSE** | • ATF level low<br>• Deteriorated ATF<br>• TCC control solenoid stuck<br>• Line pressure low<br>• Control valve stuck<br>• Torque converter malfunction<br>• TCM malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is milky or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | All ranges: Replace the oil pump, then go to Step 7.<br>Any ranges: Replace the control valve body, then go to Step 6.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT TCC CONTROL SOLENOID**<br>• Inspect the TCC control solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Replace the Torque converter, then go to the next step.<br>(See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the control valve body, then go to the next step.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2758 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Start the engine.<br>• Warm up engine and ATX.<br>• Drive the vehicle under the following conditions for **2 s or more.**<br>— ATF temperature (TFT PID):**20 °C {68 °F} or more**<br>— Engine speed: **less than 3,000 rpm**<br>— Drive in the D range, 4GR— 6GR (TCC no operation)<br>• Are any DTCs present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”.<br>(See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection.<br>(See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## DTC P2762[AW6A-EL, AW6AX-EL]

id050211805300

| DTC P2762 | TCC control solenoid range/performance (stuck) |
|---|---|
| DETECTION CONDITION | • Feedback current corresponding to solenoid current command value is irregular when engine is running.<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • ATF level low<br>• Deteriorated ATF<br>• TCC control solenoid stuck<br>• Control valve stuck<br>• TCM malfunction |

### Diagnostic procedure

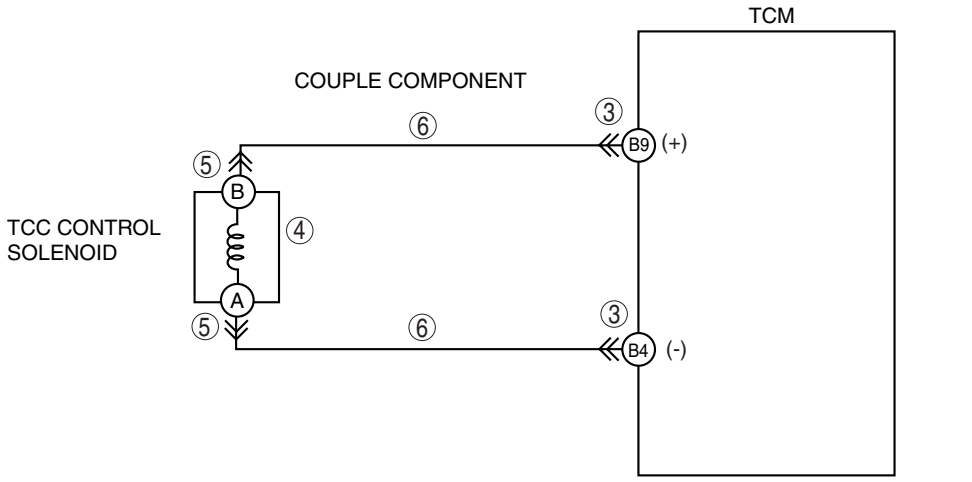
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT ATF CONDITION**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the ATF condition.<br>— Clear red: Normal<br>— Light red (pink): Water mixed in fluid<br>— Reddish brown: Deteriorated ATF<br>• Is it normal?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | If the ATF color is light red or reddish brown, replace ATF, then go to Step 7.<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 4 | **INSPECT ATF LEVEL**<br>• Start the engine.<br>• Warm up the ATX.<br>• Is the ATF level within the specification?<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Add ATF to the specified level, then go to Step 7.<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].) |
| 5 | **INSPECT LINE PRESSURE**<br>• Start the engine.<br>• Measure the line pressures.<br>(See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)<br>• Are the line pressures within the specifications? | Yes | Go to the next step. |
| | | No | • All ranges: Replace the oil pump or control valve body, then go to the next step.<br>• Any ranges: Replace the ATX, then go the next step.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | **INSPECT TCC CONTROL SOLENOID**<br>• Inspect the TCC control solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2762 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |

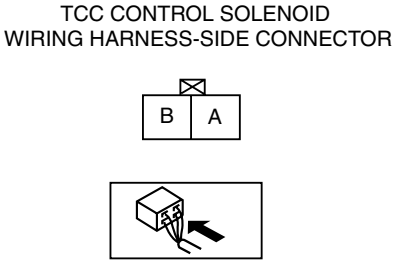
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

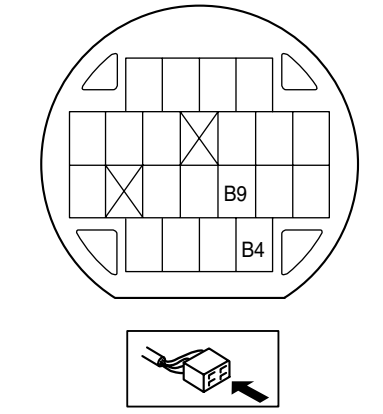
### DTC P2763[AW6A-EL, AW6AX-EL]

id050211805400

| DTC P2763 | TCC control solenoid circuit malfunction (short to power) |
|---|---|
| DETECTION CONDITION | • Short circuit in TCC control solenoid signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Short to power in wiring harness between TCC control solenoid terminal B and TCM terminal B9<br>• Short to power in wiring harness between TCC control solenoid terminal A and TCM terminal B4<br>• TCC control solenoid malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |



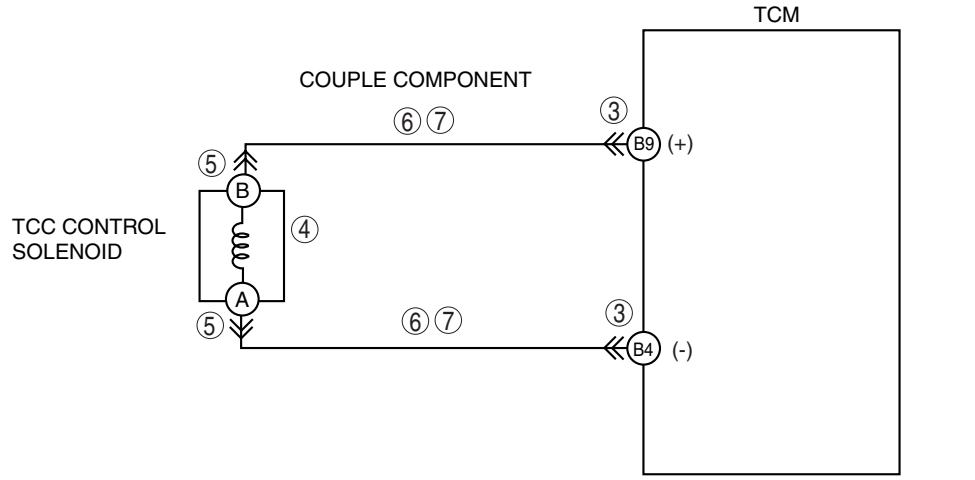
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 4 | **INSPECT RESISTANCE OF TCC CONTROL SOLENOID CIRCUIT**<br>• Inspect for resistance between couple component terminals B9 and B4 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 7. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL TCC CONTROL SOLENOID FOR POOR CONNECTION**<br>• Disconnect the TCC control solenoid connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 7. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO POWER**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B21 and all terminals except B21/ B16<br>— Terminal B16 and all terminals except B21/ B16<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | **VERIFY TROUBLESHOOTING OF DTC P2763 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 8 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

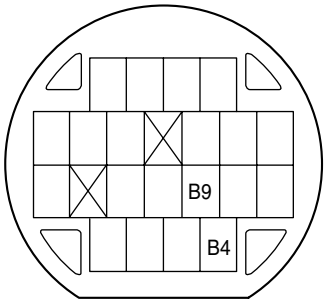
## DTC P2764[AW6A-EL, AW6AX-EL]

id050211805500

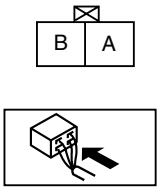
| DTC P2764 | TCC control solenoid circuit malfunction (short to ground/open circuit) |
|---|---|
| DETECTION CONDITION | • Open or short circuit in TCC control solenoid signal system (while TCM monitors solenoid output voltage, the voltage that differs from the signal output by CPU in TCM is detected).<br>**Diagnostic support note:**<br>• This is a continuous monitor (CCM).<br>• The MIL illuminates if the TCM detects the above malfunction condition during the first drive cycle.<br>• A PENDING CODE is not available.<br>• FREEZE FRAME DATA is available.<br>• The AT warning light illuminates.<br>• The DTC is stored in the TCM memory. |
| POSSIBLE CAUSE | • Open circuit between TCC control solenoid terminal B and TCM terminal B9<br>• Open circuit between TCC control solenoid terminal A and TCM terminal B4<br>• Short to ground in wiring harness between TCC control solenoid terminal B and TCM terminal B9<br>• Short to ground in wiring harness between TCC control solenoid terminal A and TCM terminal B4<br>• TCC control solenoid malfunction<br>• Damaged connector between line pressure control solenoid and TCM<br>• TCM malfunction |




COUPLE COMPONENT CONNECTOR




TCC CONTROL SOLENOID WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY FREEZE FRAME DATA HAS BEEN RECORDED**<br>• Has the FREEZE FRAME DATA been recorded? | Yes | Go to the next step. |
| | | No | Record the FREEZE FRAME DATA on the repair order, then go to the next step. |
| 2 | **VERIFY RELATED REPAIR INFORMATION AVAILABILITY**<br>• Verify related Service Bulletins and/or on-line repair information availability.<br>• Is any related repair information available? | Yes | Perform repair or diagnosis according to the available repair information.<br>• If the vehicle is not repaired, go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT TERMINAL COUPLE COMPONENT FOR POOR CONNECTION**<br>• Turn the ignition switch to the LOCK position.<br>• Remove the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 4 | **INSPECT RESISTANCE OF TCC CONTROL SOLENOID CIRCUIT**<br>• Inspect for resistance between couple component terminals B9 and B4 (wiring harness-side).<br>• Is resistance **within 5.0— 5.6 ohms**? (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | Yes | Go to go to Step 8. |
| | | No | Go to the next step. |
| 5 | **INSPECT TERMINAL TCC CONTROL SOLENOID FOR POOR CONNECTION**<br>• Disconnect the TCC control solenoid connector.<br>• Inspect for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are terminals normal? | Yes | Go to the next step. |
| | | No | Replace the couple component, then go to Step 8. |
| 6 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between couple component terminals and line pressure control solenoid terminals (wiring harness-side).<br>— Terminal B9 and terminal B<br>— Terminal B4 and terminal A<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the couple component, then go to Step 8. |
| 7 | **INSPECT TERMINAL COUPLE COMPONENT CIRCUIT FOR SHORT TO GROUND**<br>• Inspect for continuity between couple component terminals (wiring harness-side).<br>— Terminal B9 and all terminals except B9/B4<br>— Terminal B4 and all terminals except B9/B4<br>• Is there continuity? | Yes | Repair or replace the couple component, then go to the next step. |
| | | No | Replace the control valve body, then go to the next step. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 8 | **VERIFY TROUBLESHOOTING OF DTC P2764 COMPLETED**<br>• Make sure to reconnect all the disconnected connectors.<br>• Clear the DTC from the memory using the M-MDS.<br>• Drive the vehicle in D range and make sure that gears shift smoothly from 1GR to 6GR.<br>• Is same DTC present? | Yes | Replace the TCM, then go to the next step. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 9 | **VERIFY AFTER REPAIR PROCEDURE**<br>• Perform the “After Repair Procedure”. (See 05-02-4 AFTER REPAIR PROCEDURE[AW6A-EL, AW6AX-EL].)<br>• Are any DTCs present? | Yes | Go to the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) |
| | | No | DTC troubleshooting completed. |

## PID/DATA MONITOR INSPECTION[AW6A-EL, AW6AX-EL]

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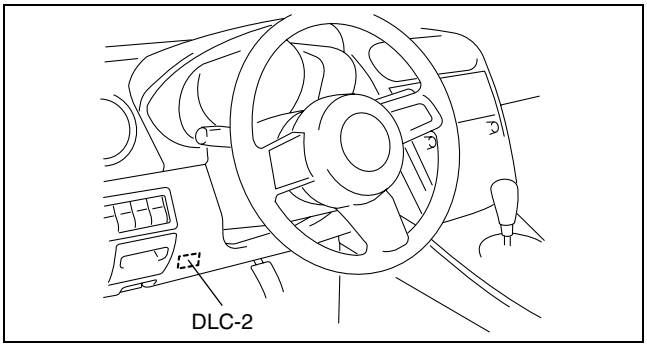
1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
- When using the IDS (notebook PC)
  1. Select the “Toolbox” tab.
  2. Select “DataLogger”.
  3. Select “Module”.
  4. Select “TCM”.
- When using the PDS (pocket PC)
  1. Select “Module Tests”.
  2. Select “TCM”.
  3. Select “DataLogger”.
3. Select the PID from the PID table.
4. Verify the PID data according to the directions on the M-MDS screen.

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**Note**
- Perform part inspection for the output device after TCM inspection.
- The PID/DATA MONITOR function monitors the calculated value of the input/output signals in the TCM. Therefore, if a monitored value of an output device is out of specification, it is necessary to inspect the monitored value of the input device related to the output device control. Since an output device malfunction is not directly indicated as a malfunction of the monitored value for the output device, it is necessary to inspect the output device individually using the simulation function.

### PID/DATA MONITOR AND RECORD function table

| Monitor item (Definition) | Unit/ Condition | Condition/Specification | Action | TCM terminal |
|---|---|---|---|---|
| BOO TCM (Brake switch) | On/Off | • Brake pedal depressed: On<br>• Other: Off | Inspect the brake switch. (See 04-11-9 BRAKE SWITCH INSPECTION.) | – |
| DTCCNT | – | Indicates number of DTC | Check DTC. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].) | – |
| DWN SW (Down switch) | On/Off | • Down shift at M range: On<br>• Other: Off | Inspect the selector lever component. (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION.) | A4 |
| ECT TCM (Engine coolant temperature) | °C, °F | Indicates ECT | Inspect the PCM. (See 01-40-6 PCM INSPECTION[L3 WITH TC].) | – |
| FDPDTC (FREEZE FRAME DATA) | – | Indicates code of FREEZE FRAME DATA | Inspect the TCM. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].) | – |
| GEAR_RA (Gear ratio) | – | • 1GR: 4.148<br>• 2GR: 2.370<br>• 3GR: 1.555<br>• 4GR: 1.154<br>• 5GR: 0.859<br>• 6GR: 0.685 | Inspect following PIDs: THOP, TSS, VSS | – |
| GEAR_SEL (Calculated gear range in TCM) | 1st/2nd/3rd/ 4th/5th/6th | • 1GR: 1st<br>• 2GR: 2nd<br>• 3GR: 3rd<br>• 4GR: 4th<br>• 5GR: 5th<br>• 6GR: 6th | Inspect following PIDs: THOP, TSS, VSS | – |
| LPS (Pressure control solenoid) | A | **100— 1,000 mA** | Inspect the pressure control solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B1, B3 |
| MNL SW (M range switch) | On/Off | • M range: On<br>• Other: Off | Inspect the selector lever component. (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION.) | A7 |

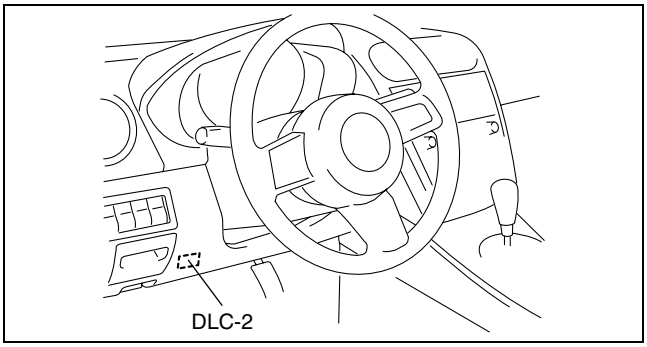
| Monitor item (Definition) | Unit/ Condition | Condition/Specification | Action | TCM terminal |
|---|---|---|---|---|
| OSS (Output shaft speed) | RPM | • Ignition switch ON:**0 RPM**<br>• Indicates output shaft speed | Inspect the VSS. (See 05-17-18 VEHICLE SPEED SENSOR (VSS) INSPECTION[AW6A-EL, AW6AX-EL].) | B19, B20 |
| PNP_TCM (Park/Neutral) | Drive/ Neutral | • P, N position: Neutral<br>• D, M range or R position: Drive | Inspect the TR switch. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].) | – |
| RPM TCM (Engine speed) | RPM | • Ignition switch ON:**0 RPM**<br>• Idle:**700— 800 RPM** | Inspect the PCM. (See 01-40-6 PCM INSPECTION[L3 WITH TC].) | – |
| SSA (Shift solenoid A) | On/Off | • M range (1GR): On<br>• Other: Off | Inspect the shift solenoid A. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B5 |
| SSB (Shift solenoid B) | On/Off | • M range (1GR): On<br>• Other: Off | Inspect the shift solenoid B. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B2 |
| SSC (Shift solenoid C) | A | • P, R, N position or D/M range (5GR, 6GR): solenoid on<br>• Other: solenoid off<br>— **100— 1,000 mA** | Inspect the shift solenoid C. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B10, B11 |
| SSD (Shift solenoid D) | A | • P, R, N position or D/M range (1GR, 2GR, 3GR): solenoid on<br>• Other: solenoid off<br>— **100— 1,000 mA** | Inspect the shift solenoid D. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B17, B18 |
| SSE (Shift solenoid E) | A | • R position (more than 11 km/h {4 mph}) or D/M range (1GR, 2GR, 4GR, 6GR): solenoid on<br>• Other: solenoid off<br>— **100— 1,000 mA** | Inspect the shift solenoid E. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B14, B22 |
| SSF (Shift solenoid F) | A | • P, R, N position or D/M range (1GR, 3GR, 4GR, 5GR): solenoid on<br>• Other: solenoid off<br>— **100— 1,000 mA** | Inspect the shift solenoid F. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B16, B21 |
| TCCC (TCC solenoid valve) | A | • TCC on: solenoid on<br>• Other: solenoid off<br>— **200— 1,000 mA** | Inspect the TCC control solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) | B4, B9 |
| TFT (ATF temperature) | °C, °F | Indicates ATF temperature | Inspect the TFT sensor. (See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].) | B7, B8 |
| TFTV (ATF temperature signal voltage) | V | • ATF temperature 10 °C {50 °F}:**4.78— 4.81 V**<br>• ATF temperature 25 °C {77 °F}:**4.61— 4.65 V**<br>• ATF temperature 110 °C {230 °F}:**2.30— 2.45 V** | Inspect the TFT sensor. (See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].) | B7, B8 |
| THOP (Throttle position) | % | • CTP: 0%<br>• WOT: 100% | Inspect the PCM. (See 01-40-6 PCM INSPECTION[L3 WITH TC].) | – |
| TR (TR switch) | R/N/D/P | • R position: R<br>• N position: N<br>• D range: D<br>• P position: P | Inspect the TR switch. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].) | – |
| TRD (TR switch [D range]) | On/Off | • D range: On<br>• Other ranges and all positions: Off | Inspect the TR switch. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].) | – |
| TRR (TR switch [R position]) | On/Off | • R position: On<br>• Other positions and all ranges: Off | Inspect the TR switch. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].) | – |
| TSS (Input/turbine speed sensor) | RPM | • Ignition switch ON:**0 RPM**<br>• Idle:**700— 800 RPM** | Inspect the input/turbine speed sensor. (See 05-17-15 INPUT/TURBINE SPEED SENSOR INSPECTION[AW6A-EL, AW6AX-EL].) | – |

| Monitor item (Definition) | Unit/ Condition | Condition/Specification | Action | TCM terminal |
|---|---|---|---|---|
| UP SW (Up switch) | On/Off | • Up shift at M range: On<br>• Other: Off | Inspect the selector lever component. (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION.) | A3 |
| VSS (Vehicle speed) | KPH, MPH | Indicates vehicle speed | Inspect the VSS. (See 05-17-18 VEHICLE SPEED SENSOR (VSS) INSPECTION[AW6A-EL, AW6AX-EL].) | – |

– : N/A

**Simulation Function Procedure**

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Toolbox” tab.
     2. Select “DataLogger”.
     3. Select “Module”.
     4. Select “TCM”.
   - When using the PDS (pocket PC)
     1. Select “Module Tests”.
     2. Select “TCM”.
     3. Select “DataLogger”.
3. Select the simulation items from the PID table.
4. Perform the simulation function, inspect the operations for each parts.
   - If there is no operation sound from the solenoid after the simulation function inspection is performed, it is possible that there is an open or short circuit in the wiring harness, or solenoid, or sticking and operation malfunction.



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**Simulation item table**

X: Available

| Simulation item | Applicable component | Unit/Condition | Operation | | TCM terminal |
|---|---|---|---|---|---|
| | | | IG ON | Idle | |
| LPS | Pressure control solenoid control signal in TCM | A | N/A | X | B1, B3 |
| SSA | Shift solenoid A | On/Off | N/A | X | B5 |
| SSB | Shift solenoid B | On/Off | N/A | X | B2 |
| SSC | Shift solenoid C | A | N/A | X | B10, B11 |
| SSD | Shift solenoid D | A | N/A | X | B17, B18 |
| SSE | Shift solenoid E | A | N/A | X | B14, B22 |
| SSF | Shift solenoid F | A | N/A | X | B16, B21 |
| TCCC | TCC solenoid valve | A | N/A | X | B4, B9 |

# 05-03 SYMPTOM TROUBLESHOOTING [AW6A-EL, AW6AX-EL]

AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM [AW6A-EL, AW6AX-EL] . . . . . 05-03–2
FOREWORD[AW6A-EL, AW6AX-EL]. . . 05-03–3
BASIC INSPECTION [AW6A-EL, AW6AX-EL] . . . . . 05-03–3
SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL] . . . . . 05-03–4
QUICK DIAGNOSIS CHART [AW6A-EL, AW6AX-EL] . . . . . 05-03–7
NO.1 VEHICLE DOES NOT MOVE IN D RANGE, OR IN R POSITION [AW6A-EL, AW6AX-EL] . . . . . 05-03–11
NO.2 VEHICLE MOVES IN N POSITION [AW6A-EL, AW6AX-EL] . . . . . 05-03–12
NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED [AW6A-EL, AW6AX-EL] . . . . . 05-03–12
NO.4 EXCESSIVE CREEP [AW6A-EL, AW6AX-EL] . . . . . 05-03–12
NO.5 NO CREEP AT ALL [AW6A-EL, AW6AX-EL] . . . . . 05-03–13
NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION [AW6A-EL, AW6AX-EL] . . . . . 05-03–14
NO.7 NO SHIFTING [AW6A-EL, AW6AX-EL] . . . . . 05-03–15
NO.8 DOES NOT SHIFT TO 6GR [AW6A-EL, AW6AX-EL] . . . . . 05-03–16
NO.9 ABNORMAL SHIFTING [AW6A-EL, AW6AX-EL] . . . . . 05-03–17
NO.10 FREQUENT SHIFTING [AW6A-EL, AW6AX-EL] . . . . . 05-03–18
NO.11 SHIFT POINT IS HIGH OR LOW [AW6A-EL, AW6AX-EL] . . . . . 05-03–18
NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION [AW6A-EL, AW6AX-EL] . . . . . 05-03–18
NO.13 NO KICKDOWN [AW6A-EL, AW6AX-EL] . . . . . 05-03–19
NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING [AW6A-EL, AW6AX-EL] . . . . . 05-03–19
NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE [AW6A-EL, AW6AX-EL] . . . . . 05-03–20
NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION[AW6A-EL, AW6AX-EL] . . 05-03–21
NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/ RANGE[AW6A-EL, AW6AX-EL] . . . . . 05-03–21
Initial Learning. . . . . 05-03–22
NO.18 EXCESSIVE SHIFT SHOCK IS GIVEN WHEN UPSHIFTING AND DOWNSHIFTING [AW6A-EL, AW6AX-EL] . . . . . 05-03–23
NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC) [AW6A-EL, AW6AX-EL] . . . . . 05-03–23
NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES [AW6A-EL, AW6AX-EL] . . . . . 05-03–23
NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D RANGE, OR IN R POSITION [AW6A-EL, AW6AX-EL] . . . . . 05-03–24
NO.22 NO ENGINE BRAKING IN 1GR POSITION OF M RANGE [AW6A-EL, AW6AX-EL] . . . . . 05-03–24
NO.23 TRANSAXLE OVERHEATS [AW6A-EL, AW6AX-EL] . . . . . 05-03–25
NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL] . . . . 05-03–26
NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING[AW6A-EL, AW6AX-EL]. . . . 05-03–26
NO.26 STARTER DOES NOT WORK [AW6A-EL, AW6AX-EL] . . . . . 05-03–27
NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE[AW6A-EL, AW6AX-EL] . . . . . 05-03–27
NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS [AW6A-EL, AW6AX-EL] . . . . . 05-03–28
NO.29 DOES NOT UPSHIFT IN M RANGE[AW6A-EL, AW6AX-EL] . . . . 05-03–28
NO.30 DOES NOT DOWNSHIFT IN M RANGE[AW6A-EL, AW6AX-EL] . . . . . 05-03–28

## AUTOMATIC TRANSAXLE CONTROL SYSTEM WIRING DIAGRAM[AW6A-EL, AW6AX-EL]

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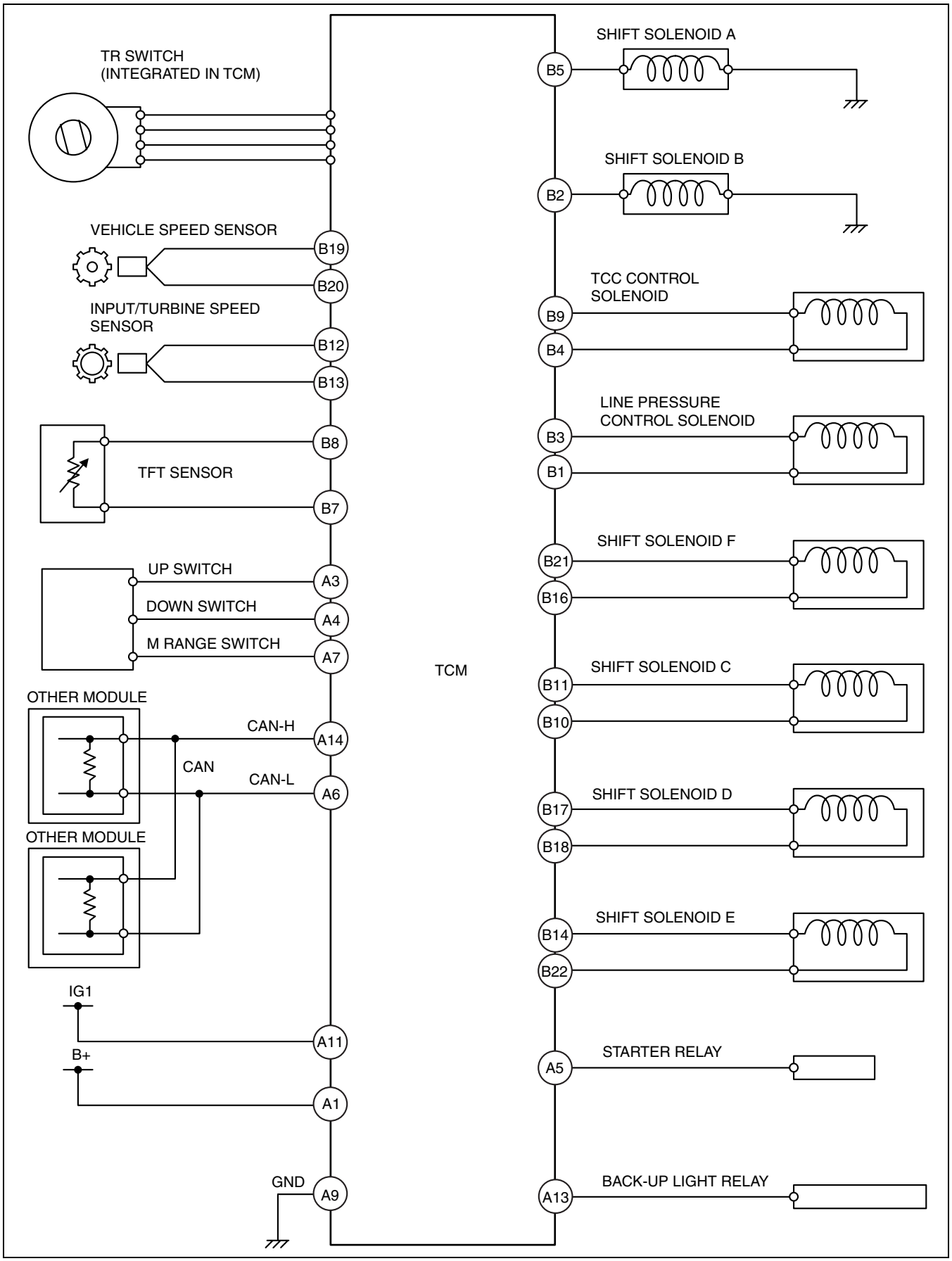


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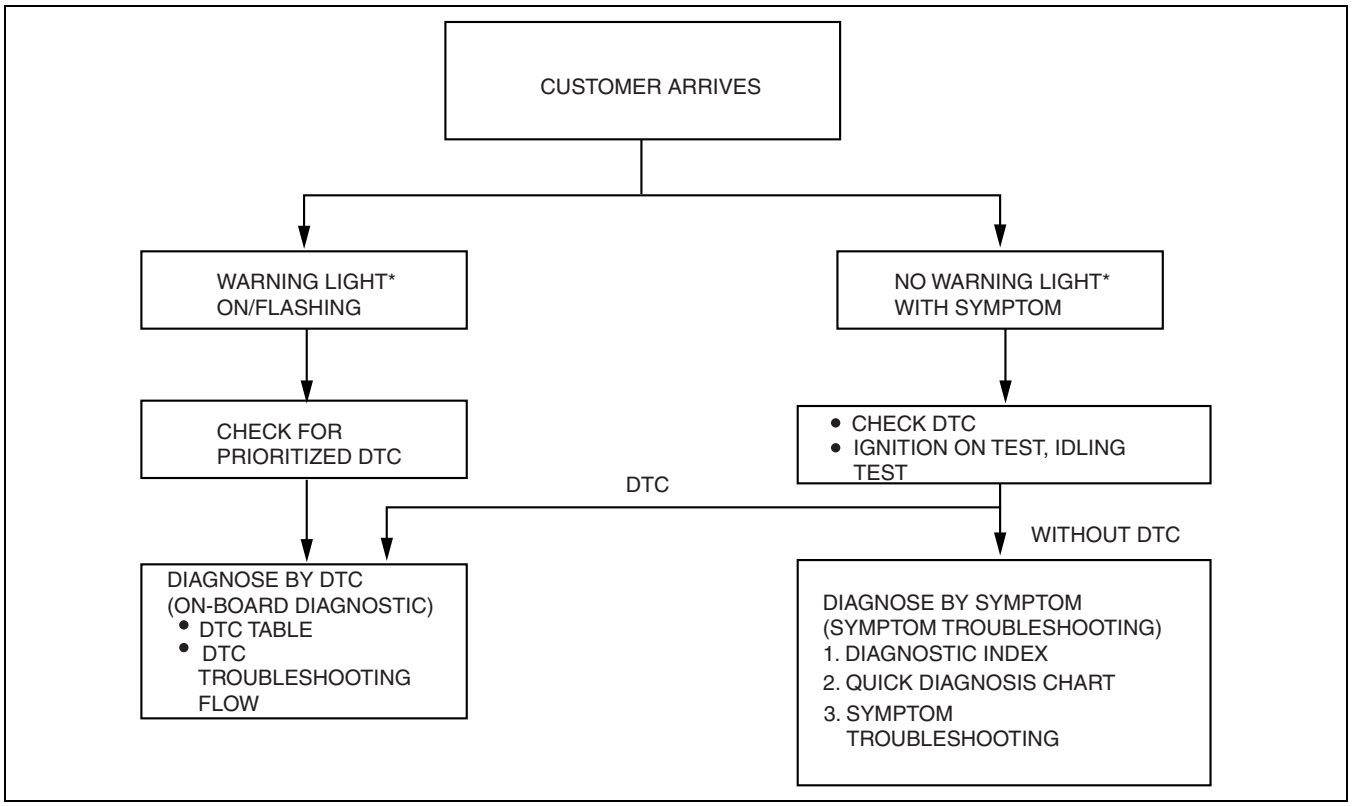
## FOREWORD[AW6A-EL, AW6AX-EL]

id050310800200

- When the customer reports a vehicle malfunction, inspect the malfunction indicator lamp (MIL) indication, AT warning indicator light flash, and diagnostic trouble code (DTC), then diagnose the malfunction according to following flowchart.
  - — If a DTC exists, diagnose the applicable DTC inspection. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].)
  - — If a DTC does not exist, the MIL does not illuminate and the AT warning indicator light illuminate, diagnose the applicable symptom troubleshooting. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)

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*: Malfunction Indicator Lamp (MIL), AT warning light.

## BASIC INSPECTION[AW6A-EL, AW6AX-EL]

id050310800300

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Measure the battery voltage.<br>• Is the battery voltage **10.0— 14.0 V**? | Yes | Go to the next step. |
| | | No | Replace or recharge the battery.<br>(See 01-17-4 BATTERY RECHARGING[L3 WITH TC].) |
| 2 | • Inspect the TCM related harnesses, connectors and fuses.<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| 3 | • Warm up the engine to normal operating temperature.<br>• Retrieve DTC using the M-MDS.<br>• Is there any DTC present? | Yes | Record Freeze Frame Data and perform appropriate DTC troubleshooting procedures. |
| | | No | Go to the next step. |
| 4 | • Perform the road test.<br>• Is the ATX operating normally? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| 5 | • Perform the time lag test.<br>• Is the ATX operating normally? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| 6 | • Perform the stall test.<br>• Is the stall speed within the specified? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | • Perform the line pressure test.<br>• Is the line pressure within the specified? | Yes | Perform the symptom troubleshooting and follow the procedures. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |
| 8 | • Inspect following part or signal related PIDs using the M-MDS.<br>— APP sensor<br>— TSS<br>— VSS<br>— TFT sensor<br>— TR switch<br>— M range switch<br>— Up switch<br>— Down switch<br>— Brake switch<br>— Engine speed<br>• Are they normal? | Yes | Perform the symptom troubleshooting and follow the procedures. |
| | | No | Repair or replace any malfunctioning parts according to the inspection result. |

### SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL]

id050310800400

- Use the chart below to verify the symptoms of the trouble in order to diagnose the appropriate area.

| No. | TROUBLESHOOTING ITEM | DESCRIPTION | PAGE |
|---|---|---|---|
| 1 | • Vehicle does not move in D range, or in R position | • Vehicle does not move when accelerator pedal is depressed. | (See 05-03-11 NO.1 VEHICLE DOES NOT MOVE IN D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL].) |
| 2 | • Vehicle moves in N position | • Vehicle creeps in N position.<br>• Vehicle creeps if brake pedal is not depressed in N position. | (See 05-03-12 NO.2 VEHICLE MOVES IN N POSITION[AW6A-EL, AW6AX-EL].) |
| 3 | • Vehicle moves in P position, or parking gear does not disengage when P position is disengaged | • Vehicle rolls when on a downward slope and tires do not lock in P position.<br>• Tires locked when P position is disengaged, vehicle does not move in D range, and R position when accelerator pedal is depressed, and engine remains in stalled condition. | (See 05-03-12 NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED[AW6A-EL, AW6AX-EL].) |
| 4 | • Excessive creep | • Vehicle accelerates in D range, and R position when accelerator pedal is not depressed. | (See 05-03-12 NO.4 EXCESSIVE CREEP[AW6A-EL, AW6AX-EL].) |
| 5 | • No creep at all | • Vehicle does not move in D range, or R position when idling on flat paved road. | (See 05-03-13 NO.5 NO CREEP AT ALL[AW6A-EL, AW6AX-EL].) |
| 6 | • Low maximum speed and poor acceleration | • Vehicle acceleration is poor at start.<br>• Delayed acceleration when accelerator pedal is depressed while driving. | (See 05-03-14 NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION[AW6A-EL, AW6AX-EL].) |
| 7 | • No shifting | • Single shift range only.<br>• Sometimes shifts correctly. | (See 05-03-15 NO.7 NO SHIFTING[AW6A-EL, AW6AX-EL].) |
| 8 | • Does not shift to 6GR | • Vehicle does not upshift from 5GR to 6GR even though vehicle speed increased.<br>• Vehicle does not shift to 6GR even though accelerator pedal is released in D range at **80 km/h {50 mph}**. | (See 05-03-16 NO.8 DOES NOT SHIFT TO 6GR[AW6A-EL, AW6AX-EL].) |
| 9 | • Abnormal shifting | • Shifts incorrectly (incorrect shift pattern). | (See 05-03-17 NO.9 ABNORMAL SHIFTING[AW6A-EL, AW6AX-EL].) |

| No. | TROUBLESHOOTING ITEM | DESCRIPTION | PAGE |
|---|---|---|---|
| 10 | • Frequent shifting | • Downshifting occurs suddenly even when accelerator pedal is depressed slightly in D range. | (See 05-03-18 NO.10 FREQUENT SHIFTING[AW6A-EL, AW6AX-EL].) |
| 11 | • Shift point is high or low | • Shift point considerably different from automatic shift diagram.<br>• Shift delays when accelerating.<br>• Shift occurs suddenly when accelerating and engine speed does not increase. | (See 05-03-18 NO.11 SHIFT POINT IS HIGH OR LOW[AW6A-EL, AW6AX-EL].) |
| 12 | • Torque converter clutch (TCC) non-operation | • TCC does not operate when vehicle reaches TCC operation range. | (See 05-03-18 NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION[AW6A-EL, AW6AX-EL].) |
| 13 | • No kickdown | • Does not downshift when accelerator pedal is fully depressed within kickdown range. | (See 05-03-19 NO.13 NO KICKDOWN[AW6A-EL, AW6AX-EL].) |
| 14 | • Engine flares up or slips when upshifting or downshifting | • When accelerator pedal is depressed, engine speed increases normally but vehicle speed increases slowly.<br>• When accelerator pedal is depressed while driving, engine speed increases but vehicle speed does not increase. | (See 05-03-19 NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING[AW6A-EL, AW6AX-EL].) |
| 15 | • Engine flares up or slips when accelerating vehicle | • Engine flares up when accelerator pedal is depressed for upshifting.<br>• Engine flares up suddenly when accelerator pedal is depressed for downshifting. | (See 05-03-20 NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE[AW6A-EL, AW6AX-EL].) |
| 16 | • Judder upon torque converter clutch (TCC) operation | • Vehicle jolts when TCC is engaged. | (See 05-03-21 NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION[AW6A-EL, AW6AX-EL].) |
| 17 | • Excessive shift shock from N to D or N to R position/range | • Strong shock is felt when shifting from N to D or N to R position/range at idle. | (See 05-03-21 NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE[AW6A-EL, AW6AX-EL].) |
| 18 | • Excessive shift shock is given when upshifting and downshifting | • Excessive shift shock is felt when depressing accelerator pedal to accelerate at upshifting.<br>• During cruising, excessive shift shock is felt when depressing accelerator pedal at downshifting. | (See 05-03-23 NO.18 EXCESSIVE SHIFT SHOCK IS GIVEN WHEN UPSHIFTING AND DOWNSHIFTING[AW6A-EL, AW6AX-EL].) |
| 19 | • Excessive shift shock on torque converter clutch (TCC) | • Strong shock is felt when TCC is engaged. | (See 05-03-23 NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC)[AW6A-EL, AW6AX-EL].) |
| 20 | • Noise occurs at idle when vehicle is stopped in all positions/ranges | • Transaxle is noisy in all positions and ranges when vehicle is idling. | (See 05-03-23 NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES[AW6A-EL, AW6AX-EL].) |
| 21 | • Noise occurs at idle when vehicle is stopped in D range, or in R position | • Transaxle is noisy in driving ranges when vehicle is idling. | (See 05-03-24 NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL].) |

| No. | TROUBLESHOOTING ITEM | DESCRIPTION | PAGE |
|---|---|---|---|
| 22 | • No engine braking in 1GR position of M range | • Engine speed drops to idle but vehicle coasts when accelerator pedal is released during cruising at medium to high speeds.<br>• Engine speed drops to idle but vehicle coasts when accelerator pedal is released when in M range (1GR) at low vehicle speed. | (See 05-03-24 NO.22 NO ENGINE BRAKING IN 1GR POSITION OF M RANGE[AW6A-EL, AW6AX-EL].) |
| 23 | • Transaxle overheats | • Burnt smell emitted from the transaxle.<br>• Smoke is emitted from the transaxle. | (See 05-03-25 NO.23 TRANSAXLE OVERHEATS[AW6A-EL, AW6AX-EL].) |
| 24 | • Engine stalls when shifted to D range, or in R position | • Engine stalls when shifting from N or P position to D range or R position at idle. | (See 05-03-26 NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL].) |
| 25 | • Engine stalls when driving at slow speeds or stopping | • Engine stalls when brake pedal is depressed while driving at low speed or stopping. | (See 05-03-26 NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING[AW6A-EL, AW6AX-EL].) |
| 26 | • Starter does not work | • Starter does not work even when P or N position is selected. | (See 05-03-27 NO.26 STARTER DOES NOT WORK[AW6A-EL, AW6AX-EL].) |
| 27 | • Gear position indicator light does not illuminate in M range | • Gear position indicator light in instrument cluster does not illuminate in M range with ignition switch at ON. | (See 05-03-27 NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE[AW6A-EL, AW6AX-EL].) |
| 28 | • Gear position indicator light illuminates in D range or P, N, R positions | • Gear position indicator light in instrument cluster illuminates in D range or P, N R positions with ignition switch at ON. | (See 05-03-28 NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS[AW6A-EL, AW6AX-EL].) |
| 29 | • Does not upshift in M range | • Gear position indicator light in instrument cluster illuminates but vehicle does not upshift when selector lever is pushed to “+” side. | (See 05-03-28 NO.29 DOES NOT UPSHIFT IN M RANGE[AW6A-EL, AW6AX-EL].) |
| 30 | • Does not downshift in M range | • Gear position indicator light in instrument cluster illuminates but vehicle does not downshift when selector lever is pushed to “–” side. | (See 05-03-28 NO.30 DOES NOT DOWNSHIFT IN M RANGE[AW6A-EL, AW6AX-EL].) |

## QUICK DIAGNOSIS CHART[AW6A-EL, AW6AX-EL]

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| | Symptom item / Cause of trouble | Selector lever is mis-adjisted | Not within line pressure specification | Not within Idle speed specification | Not within ignition timing specification | TR switch initial learning: N position learning is not performed | TR switch initial learning: Garage shift learning is not performed | Parking mechanism not operating properly | Not within ATF amount | Electrical system components / ATX outer parts: CAN signal: Engine speed (from PCM): Open/short | CAN signal: Accelerator opening (from PCM): Open/short | CAN signal: Shift position (to instrument cluster): Open/short | TCM power supply/GND: Open/short | TR switch: No signal input | TR switch: Abnormal signal input | M range switch: No signal input | M range switch: Abnormal signal input | Up switch: No signal input | Up switch: Abnormal signal input |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Vehicle does not move in D range, or in R position | X | X | | | X | | X | | | | | X | | | | | | |
| 2 | Vehicle moves in N position | X | X | | | X | | | | | | | | | | | | | |
| 3 | Vehicle moves in P position, or parking gear does not disengage when P is disengaged | X | | | | | | X | | | | | | | | | | | |
| 4 | Excessive creep | | | X | X | | | | | | | | | | | | | | |
| 5 | No creep at all | | X | | | | | | | | | | | | | | | | |
| 6 | Low maximum speed and poor acceleration | | X | | X | | | | | | | | X | | | | | | |
| 7 | No shifting | | X | | | | | | | | X | | X | | | | | | |
| 8 | Does not shift to 6GR | X | | | | | | | | | | | | X | X | X | X | | |
| 9 | Abnormal shifting | | X | | | | | | | | X | | X | | | X | | | |
| 10 | Frequent shifting | | X | | | | | | | | X | | X | | | X | | | |
| 11 | Shift point is high or low | | | | | | | | | | X | | | | | | | | |
| 12 | Torque converter clutch (TCC) non-operation | | X | | | | | | | | X | | | | | | | | |
| 13 | No kickdown | | | | | | | | | | X | | | | | | | | |
| 14 | Engine flares up or slips when upshifting or downshifting | | X | | | | | | | | X | | X | | | | | | |
| 15 | Engine flares up or slips when accelerating vehicle | | X | | | | | | | | X | | X | | | | | | |
| 16 | Judder upon torque converter clutch (TCC) operation | | X | | | | | | | | X | | X | | | | | | |
| 17 | Excessive shift shock from N to D or N to R position/range | | X | X | | | X | | | | X | | | | | | | | |
| 18 | Excessive shift shock is given when upshifting and downshifting | | X | | X | | | | | | X | | X | | | | | | |
| 19 | Excessive shift shock on torque converter clutch (TCC) | | X | | X | | | | | | X | | X | | | | | | |
| 20 | Noise occurs at idle when vehicle is stopped in all positions/ranges | | X | X | | | X | | | | | | | | | | | | |
| 21 | Noise occurs at idle when vehicle is stopped in D range, or in R position | | X | | | | | | X | | | | | | | | | | |
| 22 | No engine braking in 1GR position of M range | | X | | | | | | | | | | X | | | | | | |
| 23 | Transaxle overheats | | X | | | | | | X | | X | | | | | | | | |
| 24 | Engine stalls when shifted to D range, or in R position | | | | X | | | | | | | | | | | | | | |
| 25 | Engine stalls when driving at slow speeds or stopping | | | | | | | | | | | | | | | | | | |
| 26 | Starter does not work | X | | | | X | | | | | | | | | X | | | | |
| 27 | Gear position indicator light does not illuminate in M range | | | | | | | | | | | X | | | | X | X | | |
| 28 | Gear position indicator light illuminates in D range or P, N, R positions | | | | | | | | | | | X | | | | | X | | |
| 29 | Does not upshift in M range | | | | | | | | | | | | | | | X | | X | X |
| 30 | Does not downshift in M range | | | | | | | | | | | | | | | X | | | |

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| | Symptom item / Cause of trouble | No signal input (Down switch) | Abnormal signal input (Down switch) | No signal input (VSS) | Abnormal signal input (VSS) | No signal input (Input/turbine speed sensor) | Abnormal signal input (Input/turbine speed sensor) | Open/short (TFT sensor) | Malfunction signal input (TFT sensor) | Open/short (Starter lock relay) | Open/short (Shift solenoid A) | Open/short (Shift solenoid B) | Open/short (TCC control solenoid) | Open/short (Line pressure control solenoid) | Open/short (Shift solenoid F) | Open/short (Shift solenoid C) | Open/short (Shift solenoid D) | Open/short (Shift solenoid E) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Electrical system components | | | | | | | | | | | | | | | | |
| | | ATX outer parts | | | | | | | | | ATX inner parts | | | | | | | |
| 1 | Vehicle does not move in D range, or in R position | | | | | | | | | | | | | | X | X | X | |
| 2 | Vehicle moves in N position | | | | | | | | | | | | | X | | X | | X |
| 3 | Vehicle moves in P position, or parking gear does not disengage when P is disengaged | | | | | | | | | | | | | | | | | |
| 4 | Excessive creep | | | | | | | | | | | | | | | | | |
| 5 | No creep at all | | | X | | X | | X | | | X | X | X | X | X | X | X | X |
| 6 | Low maximum speed and poor acceleration | | | X | X | X | X | X | | | X | X | X | X | X | X | X | X |
| 7 | No shifting | | | X | X | X | X | X | | | X | X | X | X | X | X | X | X |
| 8 | Does not shift to 6GR | | | | | | | X | X | | | | X | | | | | |
| 9 | Abnormal shifting | | | X | X | X | X | | | | | | X | X | X | X | X | X |
| 10 | Frequent shifting | | | X | X | X | X | | | | | | X | X | X | X | X | X |
| 11 | Shift point is high or low | | | | X | | X | | | | | | | | | | | |
| 12 | Torque converter clutch (TCC) non-operation | | | | X | | X | | | | | | X | | | | | |
| 13 | No kickdown | | | | | | | | | | | | | | | | | |
| 14 | Engine flares up or slips when upshifting or downshifting | | | X | X | X | X | | | | | | X | X | X | X | X | X |
| 15 | Engine flares up or slips when accelerating vehicle | | | X | X | X | X | | | | | | X | X | X | X | X | X |
| 16 | Judder upon torque converter clutch (TCC) operation | | | X | X | X | X | | | | | | X | | | | | |
| 17 | Excessive shift shock from N to D or N to R position/range | | | | | | | X | X | | | | | X | | X | | X |
| 18 | Excessive shift shock is given when upshifting and downshifting | | | X | X | X | X | X | X | | | | X | X | X | X | X | X |
| 19 | Excessive shift shock on torque converter clutch (TCC) | | | X | X | X | X | | | | | | X | | | | | |
| 20 | Noise occurs at idle when vehicle is stopped in all positions/ranges | | | | | | | | | | | | X | X | | | | |
| 21 | Noise occurs at idle when vehicle is stopped in D range, or in R position | | | | | | | | | | | | | | | | | |
| 22 | No engine braking in 1GR position of M range | | | X | X | X | X | | | | X | X | | | | | | |
| 23 | Transaxle overheats | | | | | | | | X | | | | | | | | | |
| 24 | Engine stalls when shifted to D range, or in R position | | | | | | X | | | | | | X | | | | | |
| 25 | Engine stalls when driving at slow speeds or stopping | | | | | | X | | | | | | X | | | | | |
| 26 | Starter does not work | | | | | | | | | X | | | | | | | | |
| 27 | Gear position indicator light does not illuminate in M range | | | | | | | | | | | | | | | | | |
| 28 | Gear position indicator light illuminates in D range or P, N, R positions | | | | | | | | | | | | | | | | | |
| 29 | Does not upshift in M range | | | | | | | | | | | | | | | | | |
| 30 | Does not downshift in M range | X | X | | | | | | | | | | | | | | | |

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| | Symptom item / Cause of trouble | Valve body spool is not operating properly | C1 accumulator is not operating properly | C2 accumulator is not operating properly | C3 accumulator is not operating properly | B1 accumulator is not operating properly | B2 accumulator is not operating properly | Centrifugal hydraulic pressure clutch is not operating properly | Clogging | Shift solenoid A hydraulic circuit | Clogging | Shift solenoid B hydraulic circuit | Clogging | TCC control solenoid hydraulic circuit | Clogging | Line pressure control solenoid hydraulic circuit | Clogging | Shift solenoid F hydraulic circuit | Clogging | Shift solenoid C hydraulic circuit | Clogging | Shift solenoid D hydraulic circuit | Clogging | Shift solenoid E hydraulic circuit | ATF cooler is not operating properly |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hydraulic system components | | | | | | | | | | | | | | | | | | | | | | | |
| | | Control valve body | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Vehicle does not move in D range, or in R position | | X | X | X | X | X | | | | | | | | | | | X | X | X | | | | | |
| 2 | Vehicle moves in N position | | X | | X | | | | | | | | | | X | | | X | | X | | | | | |
| 3 | Vehicle moves in P position, or parking gear does not disengage when P is disengaged | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Excessive creep | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | No creep at all | X | X | | X | X | | | | | | | | | X | X | X | X | X | | | | | | |
| 6 | Low maximum speed and poor acceleration | X | X | X | X | X | | | | | | | | | X | X | X | X | X | | | | | | |
| 7 | No shifting | X | X | X | X | X | | | | | | | | | X | X | X | X | X | | | | | | |
| 8 | Does not shift to 6GR | X | | | | | | | | | | | | X | X | | | | | | | | | | |
| 9 | Abnormal shifting | X | X | X | X | X | | | | | | | | X | X | X | X | X | X | | | | | | |
| 10 | Frequent shifting | X | X | X | X | X | | | | | | | | X | X | X | X | X | X | | | | | | |
| 11 | Shift point is high or low | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | Torque converter clutch (TCC) non-operation | | | | | | | | | | | | | X | | | | | | | | | | | |
| 13 | No kickdown | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | Engine flares up or slips when upshifting or downshifting | X | X | X | X | X | | | | | | | | X | X | X | X | X | X | | | | | | |
| 15 | Engine flares up or slips when accelerating vehicle | X | X | X | X | X | | | | | | | | X | X | X | X | X | X | | | | | | |
| 16 | Judder upon torque converter clutch (TCC) operation | X | | | | | | X | | | | | | X | | | | | | | | | | | |
| 17 | Excessive shift shock from N to D or N to R position/range | X | X | | X | | | | | | | | | | | | X | X | | X | | | | | |
| 18 | Excessive shift shock is given when upshifting and downshifting | X | X | X | X | X | | | | | | | | X | X | X | X | X | X | | | | | | |
| 19 | Excessive shift shock on torque converter clutch (TCC) | X | | | | | | X | | | | | | X | | | | | | | | | | | |
| 20 | Noise occurs at idle when vehicle is stopped in all positions/ranges | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | Noise occurs at idle when vehicle is stopped in D range, or in R position | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | No engine braking in 1GR position of M range | X | | | | | X | | X | X | | | | | | | | | | | | | | | |
| 23 | Transaxle overheats | | | | | | | | | | | | | | | | | | | | | | | | X |
| 24 | Engine stalls when shifted to D range, or in R position | | | | | | | | | | | | | X | | | | | | | | | | | |
| 25 | Engine stalls when driving at slow speeds or stopping | | | | | | | | | | | | | X | | | | | | | | | | | |
| 26 | Starter does not work | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | Gear position indicator light does not illuminate in M range | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | Gear position indicator light illuminates in D range or P, N, R positions | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | Does not upshift in M range | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | Does not downshift in M range | | | | | | | | | | | | | | | | | | | | | | | | |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | Vehicle does not move in D range, or in R position | X | X | X | X | | |
| 2 | Vehicle moves in N position | | X | | | | |
| 3 | Vehicle moves in P position, or parking gear does not disengage when P is disengaged | | | | | | |
| 4 | Excessive creep | | | | | | |
| 5 | No creep at all | | X | | X | | |
| 6 | Low maximum speed and poor acceleration | X | X | | | | |
| 7 | No shifting | | X | | | | |
| 8 | Does not shift to 6GR | X | X | | X | | X |
| 9 | Abnormal shifting | | | | | | |
| 10 | Frequent shifting | | | | | | |
| 11 | Shift point is high or low | | | | | | |
| 12 | Torque converter clutch (TCC) non-operation | | | | | | |
| 13 | No kickdown | | | | | | |
| 14 | Engine flares up or slips when upshifting or downshifting | X | X | | | | |
| 15 | Engine flares up or slips when accelerating vehicle | X | X | | | | |
| 16 | Judder upon torque converter clutch (TCC) operation | X | X | | X | X | X |
| 17 | Excessive shift shock from N to D or N to R position/range | X | X | | | | |
| 18 | Excessive shift shock is given when upshifting and downshifting | X | X | | | | |
| 19 | Excessive shift shock on torque converter clutch (TCC) | X | X | | X | X | X |
| 20 | Noise occurs at idle when vehicle is stopped in all positions/ranges | | | | | | |
| 21 | Noise occurs at idle when vehicle is stopped in D range, or in R position | | | | | | |
| 22 | No engine braking in 1GR position of M range | X | X | | | | |
| 23 | Transaxle overheats | | | | | | |
| 24 | Engine stalls when shifted to D range, or in R position | | | | | | X |
| 25 | Engine stalls when driving at slow speeds or stopping | | | | | | X |
| 26 | Starter does not work | | | | | | |
| 27 | Gear position indicator light does not illuminate in M range | | | | | | |
| 28 | Gear position indicator light illuminates in D range or P, N, R positions | | | | | | |
| 29 | Does not upshift in M range | | | | | | |
| 30 | Does not downshift in M range | | | | | | |

| Symptom item / Cause of trouble | Powertrain | | | | | |
|---|---|---|---|---|---|---|
| | Slipping (clutch, brake) | Burnt (clutch, brake) | One-way clutch is not operated properly | Torque converter is not operating properly | TCC is cracking or peeling | TCC is not operating properly |

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## NO.1 VEHICLE DOES NOT MOVE IN D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL]

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| 1 | Vehicle does not move in D range, or in R position |
|---|---|
| DESCRIPTION | • Vehicle does not move when accelerator pedal is depressed. |
| POSSIBLE CAUSE | • If the vehicle does not move in D range or R position, basically, the malfunction is in the ATX. (Vehicle will move even with a malfunction in the TCM.) Since a malfunction is in the sensor circuit or output circuit is the cause of the malfunction in the ATX, inspect the sensors, output circuit, and the related wiring harnesses.<br>— Clutch slippage, worn (D range-C1 clutch, One-way clutch, R position-C3 clutch, B2 brake)<br>• Line pressure low<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Sensor GND malfunction<br>• Body GND malfunction<br>• Control valve body malfunction<br>— Selector lever malfunction<br>— Parking mechanism not operating properly<br>— Torque converter malfunction<br>— N position learning is not performed<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • When the vehicle is stopped on a flat, level road and the engine off, does the vehicle move when pushed? (in D range or N, R positions with the brake pedal released) | Yes | Go to the next step. |
| | | No | Inspect for parking mechanism. |
| 2 | • Start the engine.<br>• Does vehicle move when selector lever in between N position and D range? | Yes | Inspect or adjust selector lever.<br>(See 05-18-6 SELECTOR LEVER INSPECTION.)<br>(See 05-18-7 SELECTOR CABLE ADJUSTMENT.)<br>Perform N position learning.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 3 | • Stop the engine.<br>• Inspect following solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>— Shift solenoid E<br>— Shift solenoid F<br>— Line pressure control solenoid<br>• Are these normal? | Yes | Replace the ATX (clutch slippage, worn)<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Inspect the coupler component.<br>If normal, replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.2 VEHICLE MOVES IN N POSITION[AW6A-EL, AW6AX-EL]

id050310800700

| 2 | Vehicle moves in N position |
|---|---|
| DESCRIPTION | • Vehicle creeps in N position.<br>• Vehicle creeps if brake pedal is not depressed in N position. |
| POSSIBLE CAUSE | • If the vehicle moves in N position, basically, the malfunction is in the ATX. Since a malfunction in the sensor circuit or output circuit is the cause of the malfunction in the ATX, inspect the sensors, output circuit, and the related wiring harnesses.<br>— Clutch burnt (C1 clutch, C3 clutch, One-way clutch)<br>• Line pressure low<br>• Shift solenoid C malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• Control valve body malfunction<br>— Selector lever position disparity (Although the selector indicator shows N position, the hydraulic circuit shows D range or R position)<br>• N position learning is not performed<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Does the vehicle creep when selector lever is moved slightly in N position? | Yes | Go to the next step. |
| | | No | Inspect and adjust the selector lever.<br>(See 05-18-6 SELECTOR LEVER INSPECTION.)<br>(See 05-18-7 SELECTOR CABLE ADJUSTMENT.)<br>Perform N position learning.<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 2 | • Inspect following solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>• Are these solenoids normal? | Yes | Replace the ATX (clutch slippage, worm).<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Inspect the coupler component.<br>If normal, replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.3 VEHICLE MOVES IN P POSITION, OR PARKING GEAR DOES NOT DISENGAGE WHEN P IS DISENGAGED[AW6A-EL, AW6AX-EL]

id050310800800

| 3 | Vehicle moves in P position, or parking gear does not disengage when P is disengaged |
|---|---|
| DESCRIPTION | • Vehicle rolls on a downward slope in P position.<br>• Tires are locked when P is disengaged. Vehicle does not move in D range, and R position when the accelerator pedal is depressed, and the engine remains in a stalled condition. |
| POSSIBLE CAUSE | • Parking mechanism malfunction (May have effect on noise or shock from transaxle)<br>• Improper adjustment of selector lever<br>• If the vehicle moves in N position, perform No.2 “VEHICLE MOVES IN N POSITION” |

### NO.4 EXCESSIVE CREEP[AW6A-EL, AW6AX-EL]

id050310800900

| 4 | Excessive creep |
|---|---|
| DESCRIPTION | • Vehicle accelerates in D range, and R position when accelerator pedal is not depressed. |
| POSSIBLE CAUSE | • Engine idle speed is high (transaxle system is not cause of problem)<br>• Go to No.9 “FAST IDLE/RUNS ON”<br>(See 01-03-37 NO.9 FAST IDLE/RUNS ON[L3 WITH TC].) |

## NO.5 NO CREEP AT ALL[AW6A-EL, AW6AX-EL]

id050310801000

| 5 | No creep at all |
|---|---|
| DESCRIPTION | • Vehicle does not move in D range and R position when idling on a flat paved road. |
| POSSIBLE CAUSE | • Either engine output low or there is clutch slippage.<br>— Clutch burnt (C1 clutch, C3 clutch)<br>• Line pressure low<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Body GND malfunction<br>• Control valve body malfunction<br>— Transaxle fixed in 3GR or 5GR* (Operation of fail-safe function)<br>• Short or open circuit in wiring harness<br>• Poor connection of connector<br>• Malfunction of electronic parts of output and input system<br>— There is no engine torque<br>• Torque converter malfunction<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Does the vehicle creep in P and/or N position? | Yes | Inspect or adjust the selector lever.<br>(See 05-18-6 SELECTOR LEVER INSPECTION.)<br>(See 05-18-7 SELECTOR CABLE ADJUSTMENT.) |
| | | No | Go to the next step. |
| 2 | • Stop the engine.<br>• Inspect following solenoid.<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>— Shift solenoid E<br>— Shift solenoid F<br>— Line pressure control solenoid<br>• Are these solenoids normal? | Yes | Go to the next step. |
| | | No | Inspect the coupler component.<br>If normal, replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | • Remove the torque converter.<br>(See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect the torque converter.<br>• Is the torque converter normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle.<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the torque converter. |
| 4 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

* : If case of shift solenoid C failure

## NO.6 LOW MAXIMUM SPEED AND POOR ACCELERATION[AW6A-EL, AW6AX-EL]

id050310801100

| 6 | Low maximum speed and poor acceleration |
|---|---|
| DESCRIPTION | • Vehicle acceleration is poor at start.<br>• Delayed acceleration when accelerator pedal is depressed while driving. |
| POSSIBLE CAUSE | • If the clutch is stuck or does not stay in 4GR, malfunction is in engine circuit.<br>— Clutch slippage, burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake)<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Sensor GND malfunction<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Body GND malfunction<br>• Control valve body malfunction<br>— Transaxle fixed in 3GR or 5GR* (Operation of fail-safe function)<br>• Short or open circuit in wiring harness<br>• Poor connection of connector<br>• Malfunction of electronic parts of output and input system<br>— Insufficient starting torque (Suspected when in-gear, shift control and engine circuit are normal)<br>• Torque converter malfunction (Poor operation, stuck)<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • With the ignition switch at the ON position, does the gear position indicator light indication correspond to the selector lever position? | Yes | Go to the next step. |
| | | No | Go to No.27 “GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE”, or No.28 “GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. |
| 2 | • Go to No.12 “LACK/LOSS OF POWER (ACCELERATION/CRUISE)”. (See 01-03-46 NO.12 LACK/LOSS OF POWER (ACCELERATION/CRUISE)[L3 WITH TC].)<br>• Does engine control system normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 3 | • Stop the engine.<br>• Inspect following solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>— Shift solenoid E<br>— Shift solenoid F<br>— Line pressure control solenoid<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Inspect the coupler component.<br>If normal, replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | • Remove the torque converter. (See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect the torque converter.<br>• Is the torque converter normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the torque converter. |

| STEP | INSPECTION | ACTION |
|---|---|---|
| 5 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | |

* : If case of shift solenoid C failure

### NO.7 NO SHIFTING[AW6A-EL, AW6AX-EL]

id050310801200

| 7 | No shifting |
|---|---|
| DESCRIPTION | • Single shift range only.<br>• Sometimes it shifts correctly. |
| POSSIBLE CAUSE | • When the gear position is fixed in 3GR or 5GR* due to the fail-safe operation, malfunction is in the ATX.<br>• Perform malfunction diagnosis according to No.6 “LOW MAXIMUM SPEED AND POOR ACCELERATION”.<br>— Clutch burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake)<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Sensor GND malfunction<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Control valve body malfunction<br>— 3GR or 5GR* is fixed (Operation in fail-safe function)<br>• Short or open circuit in wiring harness<br>• Poor connection of connector<br>• Poor ground of shift solenoid<br>• Malfunction of electronic parts of output and input system |

* : If case of shift solenoid C failure

## NO.8 DOES NOT SHIFT TO 6GR[AW6A-EL, AW6AX-EL]

id050310801300

| 8 | Does not shift to 6GR |
|---|---|
| DESCRIPTION | • Vehicle does not upshift from 5GR to 6GR even though vehicle speed is increased.<br>• Vehicle does not shift to 6GR even though accelerator pedal is released in D range at **80 km/h {50 mph}.** |
| POSSIBLE CAUSE | • Basically, TCC does not operate when the fail-safe is operating. Verify the DTC at first. If the TCC operates when driving at high speeds only, the malfunction (improper adjustment) is in the M range switch circuit or TR switch circuit.<br>**Caution**<br>• **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.**<br><br>— TCC slippage, burnt<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Sensor GND malfunction<br>— TFT sensor malfunction<br>• Short or open circuit in wiring harness<br>• Poor connection of connector<br>• Sensor malfunction<br>— TR switch malfunction<br>• Selector lever adjustment incorrect<br>• TR switch adjustment incorrect<br>— TCC control solenoid malfunction<br>• Short or open circuit in wiring harness<br>• Poor connection of connector<br>• Solenoid valve stuck<br>— M range switch malfunction<br>• Selector lever adjustment incorrect<br>• Short or open circuit in wiring harness<br>— Torque converter malfunction<br>— Control valve body malfunction<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • With the ignition switch at the ON position.<br>• Does the gear position indicator light indication correspond to selector lever position? | Yes | Go to the next step. |
| | | No | Go to No.27 “GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE”, or No.28 “GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. |
| 2 | • Drive the vehicle in D range and inspect following:<br>— 1–2 shift up and down<br>— 2–3 shift up and down<br>— 3–4 shift up and down<br>— 4–5 shift up and down<br>— 5–6 shift up and down<br>• Are all shift-up and shift-down possible? | Yes | Go to the next step. |
| | | No | **No shift at all:**<br>• Go to No.7 “NO SHIFTING”.<br>**Abnormal shift:**<br>• Go to No.9 “ABNORMAL SHIFTING”. |
| 3 | • Stop the engine.<br>• Inspect following solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>— Shift solenoid E<br>— Shift solenoid F<br>— Line pressure control solenoid<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Inspect for shift solenoid stuck. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | • Remove the torque converter. (See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect the torque converter.<br>• Is the torque converter normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the torque converter. |
| 5 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |



### NO.9 ABNORMAL SHIFTING[AW6A-EL, AW6AX-EL]

id050310801400

| 9 | Abnormal shifting |
|---|---|
| DESCRIPTION | • Shift incorrectly (incorrect shift pattern). |
| POSSIBLE CAUSE | • There is a malfunction in the signal circuit which controls shifting (Accelerator opening signal, input/turbine speed sensor, VSS), the control valve is stuck, or the clutch circuit is stuck.<br>— Clutch slippage, burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake)<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Sensor GND malfunction<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• TCC control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Body GND malfunction<br>• Control valve body malfunction<br>• TR switch adjustment incorrect<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect for continuity between the TCM terminal A9 and battery negative terminal.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace ground circuit. |
| 2 | • Inspect following shift solenoids. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>— Shift solenoid E<br>— Line pressure control solenoid<br>— TCC control solenoid<br>— Shift solenoid F<br>• Are they normal? | Yes | Inspect the TCM terminal for bend, damage, corrosion or poor contact. |
| | | No | Inspect the coupler component.<br>If normal, replace the control valve body.<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.10 FREQUENT SHIFTING[AW6A-EL, AW6AX-EL]

id050310801500

| 10 | Frequent shifting |
|---|---|
| DESCRIPTION | • Downshifting occurs suddenly even when accelerator pedal is depressed slightly in D range. |
| POSSIBLE CAUSE | • The malfunctioning circuit is basically the same as No.9 “ABNORMAL SHIFTING”. However, a malfunction of the input signal to the accelerator pedal position sensor, APP sensor, input/turbine speed sensor, VSS (including the sensor GND, sensor wiring harness and connector), or clutch slippage (clutch stuck, low pressure in line) may also be the cause. |

### NO.11 SHIFT POINT IS HIGH OR LOW[AW6A-EL, AW6AX-EL]

id050310801600

| 11 | Shift point is high or low |
|---|---|
| DESCRIPTION | • Shift point considerably different from automatic shift diagram.<br>• Shift delays when accelerating.<br>• Shift occurs quickly when accelerating and engine speed does not increase. |
| POSSIBLE CAUSE | • If the transaxle does not shift abnormally, there is a malfunction of the input signal to the APP sensor, input/turbine speed sensor, or VSS.<br>• If the engine speed is high or low, regardless of normal shifting, inspect the tachometer.<br>• Verify that the output signals of the accelerator pedal position sensor and APP sensor change linearly. |

### NO.12 TORQUE CONVERTER CLUTCH (TCC) NON-OPERATION[AW6A-EL, AW6AX-EL]

id050310801700

| 12 | Torque converter clutch (TCC) non-operation |
|---|---|
| DESCRIPTION | • TCC does not operate when vehicle reaches TCC operation range. |
| POSSIBLE CAUSE | • Basically, TCC does not operate when the fail-safe is operating. Verify the DTC at first. If the TCC operates when driving at high speeds only, the malfunction (improper adjustment) is in the M range switch circuit or TR switch circuit.<br>**Caution**<br>• **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.**<br><br>• TCC slippage, burnt<br>— Line pressure low<br>• Incorrect accelerator opening signal<br>• Input/turbine speed sensor malfunction<br>• VSS malfunction<br>• Output solenoid valve system malfunction (Sticking)<br>• TCC control solenoid malfunction<br>• Control valve body system malfunction (Poor operation, sticking)<br>• TCC hydraulic pressure system malfunction<br>• Accelerator pedal position sensor malfunction (Not operating linearly)<br>• Input/turbine speed sensor or VSS malfunction<br>• Operation of fail-safe function.<br>— Short to power or GND at TCC control solenoid related circuit.<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • With the ignition switch at the ON position.<br>• Does the gear position indicator light indication correspond to the selector lever position? | Yes | Go to the next step. |
| | | No | Go to No.27 “GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE”, or No.28 “GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS”. |
| 2 | • Disconnect the TCM.<br>• Is the resistance between the TCM ground terminal A9 and the body GND **less than 5.0 ohms**? | Yes | Go to the next step. |
| | | No | Repair open ground circuit. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | • Inspect the line pressure control solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is the line pressure control solenoid normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | • Remove the torque converter. (See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect the torque converter.<br>• Is the torque converter normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the torque converter. |
| 5 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |



### NO.13 NO KICKDOWN[AW6A-EL, AW6AX-EL]

id050310801800

| 13 | No kickdown |
|---|---|
| DESCRIPTION | • Does not downshift when accelerator pedal is fully depressed within kickdown range. |
| POSSIBLE CAUSE | • If transaxle does not downshift though shifting is normal, the malfunction is in the accelerator pedal position sensor and accelerator pedal position sensor circuits (including sensor GND, sensor wiring harness and connector). |

### NO.14 ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING[AW6A-EL, AW6AX-EL]

id050310801900

| 14 | Engine flares up or slips when upshifting or downshifting |
|---|---|
| DESCRIPTION | • When the accelerator pedal is depressed for acceleration from standstill, engine speed increases but the vehicle speed increases slowly.<br>• When the accelerator pedal is depressed while driving, engine speed increases but the vehicle speed does not. |
| POSSIBLE CAUSE | • There is clutch slippage because the clutch is stuck or the line pressure is low.<br>— Clutch stuck, slippage (C1 clutch, C2 clutch, C3 clutch, B1 brake)<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Sensor GND malfunction<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• TCC control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Body GND malfunction<br>• Control valve body malfunction<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is the line pressure normal? (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 2 | • Is shift point normal? (See 05-17-7 ROAD TEST[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Go to No.9 “ABNORMAL SHIFTING”. |
| 3 | • Stop the engine.<br>• Inspect following solenoids. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid C<br>— Shift solenoid D<br>— Shift solenoid E<br>— Line pressure control solenoid<br>— TCC control solenoid<br>— Shift solenoid F<br>• Are they normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | • Inspect the coupler component for open or short.<br>• Are coupler component normal? | Yes | Go to the next step. |
| | | No | Replace the coupler component. |
| 5 | • Inspect the ATF condition.<br>• Are a large amount of specks found? | Yes | Replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 6 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.15 ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE[AW6A-EL, AW6AX-EL]

id050310802000

| 15 | Engine flares up or slips when accelerating the vehicle |
|---|---|
| DESCRIPTION | • Engine flares up when the accelerator pedal is depressed for upshifting.<br>• Engine flares up suddenly when the accelerator pedal is depressed for downshifting. |
| POSSIBLE CAUSE | • The malfunction is basically the same as for No.14 “ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING”.<br>— If conditions for No.14 worsen, the malfunction will develop to No.15. |

## NO.16 JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION[AW6A-EL, AW6AX-EL]

id050310802100

| 16 | Judder upon torque converter clutch (TCC) operation |
|---|---|
| DESCRIPTION | • Vehicle jolts when TCC is engaged. |
| POSSIBLE CAUSE | • Poor TCC engagement due to either slippage because the TCC piston is stuck or the line pressure is low.<br>**Caution**<br>• **If the TCC is stuck, inspect it. In addition, inspect the oil cooler for foreign particles which may have mixed in with the ATF.**<br><br>— TCC slippage, burnt<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Sensor GND malfunction<br>• TCC control solenoid malfunction<br>• Control valve body malfunction<br>— Torque converter malfunction<br>— Centrifugal hydraulic pressure clutch is not operating properly |



## NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE[AW6A-EL, AW6AX-EL]

id050310802200

| 17 | Excessive shift shock from N to D or N to R position/range |
|---|---|
| DESCRIPTION | • Strong shock felt when shifting from N to D or N to R position/range at idle. |
| POSSIBLE CAUSE | • Shift shock may worsen when the fail-safe is operating. If no DTC is output, the shift shock may worsen due to poor operation of the control valve body or sticking of the clutch.<br>— Clutch burnt (N→D: C1 clutch, N→R: C3 clutch or B2 brake)<br>• Line pressure low<br>• Incorrect accelerator opening signal<br>• TFT sensor malfunction<br>• Sensor GND malfunction<br>• Shift solenoid C malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• Control valve body malfunction<br>— Poor hydraulic operation (Malfunction in range change)<br>— Idle speed high<br>— Poor tightening torque of engine mount, exhaust mount<br>— Line pressure high<br>— Garage shift control is not learned<br>• Initial learning did not perform<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Does the shift shock occur only when the engine is cold? | Yes | Go to the next step. |
| | | No | Go to Step 3. |
| 2 | • Inspect the TFT sensor and related wiring harness: vibration, intermittent open/short circuit. (See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace part if necessary. |
| 3 | • Perform the initial learning procedure. (See 05-03-22 Initial Learning.)<br>• Does symptom eliminate? | Yes | Troubleshooting is completed. |
| | | No | Go to the next step. |
| 4 | • Is the line pressure normal? (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | • Is stall speed normal? (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 6 | • Stop the engine.<br>• Inspect following solenoids. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Line pressure control solenoid<br>— Shift solenoid C<br>— Shift solenoid E<br>• Are they normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | • Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

**Initial Learning**

**Warning**
- **When performing initial learning, be aware of other vehicles, people, and other impediments in order to avoid an accident.**

**Note**
- While self-learning control gradually reduces shock during normal driving, initial learning is performed to initially learn a certain amount of driving conditions.

1. Warm-up
   - Increase the ATF temperature by leaving the vehicle idling or performing city driving. Verify that the ATF temperature is between **66— 110 °C {151— 230 °F}**. If the ATF temperature is outside this range, work to bring it inside the range.

   **Caution**
   - **Do not raise the ATF temperature by stalling the engine.**

   **Note**
   - If the ATF temperature is not between **66— 110 °C {151— 230 °F}**, initial learning cannot be performed. Before learning, inspect for variable shift shock.

2. Garage shift learning
   - With the vehicle standing still, depress the brake pedal and keep the selector lever in N position for **3 s**. Then, shift the selector lever from the N position into D range, and maintain in this condition for **3 s**. Repeat this procedure **5 times**. Then repeat it **5 times** in the same way for R position.
3. Gear shift control learning
   - In D range, with the accelerator opening between **25— 30%**, drive until you reach 6th gear and a vehicle speed of **80 km/h {50 mph}** or higher. Then, release the accelerator pedal and coast, and bring the vehicle to a stop in at least **60 s**. Repeat this procedure **10 times**.
4. Inspect learning results
   - Verify that variable speed shock and shift shock have decreased compared to the conditions before learning.

### NO.18 EXCESSIVE SHIFT SHOCK IS GIVEN WHEN UPSHIFTING AND DOWNSHIFTING[AW6A-EL, AW6AX-EL]

id050310802300

| 18 | Excessive shift shock is given when upshifting and downshifting |
|---|---|
| DESCRIPTION | • Excessive shift shock is felt when depressing the accelerator pedal at upshifting.<br>• During cruising, excessive shift shock is felt when depressing accelerator pedal at downshifting. |
| POSSIBLE CAUSE | • Shift shock may worsen when the fail-safe is operating. The shift shock may worsen if the accelerator pedal position sensor, APP sensor, input/turbine speed sensor, or VSS signal malfunctions.<br>— Clutch slippage, burnt (C1 clutch, C2 clutch, C3 clutch, B1 brake)<br>• Line pressure low, high<br>• Incorrect accelerator opening signal<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• TFT sensor malfunction<br>• Shift solenoid C malfunction<br>• Shift solenoid D malfunction<br>• Shift solenoid E malfunction<br>• Line pressure control solenoid malfunction<br>• TCC control solenoid malfunction<br>• Shift solenoid F malfunction<br>• Body GND and sensor GND malfunction<br>• Control valve body malfunction<br>— Poor hydraulic operation (Malfunction in range change) |



### NO.19 EXCESSIVE SHIFT SHOCK ON TORQUE CONVERTER CLUTCH (TCC)[AW6A-EL, AW6AX-EL]

id050310802400

| 19 | Excessive shift shock on torque converter clutch (TCC) |
|---|---|
| DESCRIPTION | • Strong shock is felt when the TCC is engaged. |
| POSSIBLE CAUSE | • The troubleshooting flow is the same as No.16 “JUDDER UPON TORQUE CONVERTER CLUTCH (TCC) OPERATION”. |

### NO.20 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES[AW6A-EL, AW6AX-EL]

id050310802500

| 20 | Noise occurs at idle when vehicle is stopped in all positions/ranges |
|---|---|
| DESCRIPTION | • Transaxle is noisy in all positions and ranges when the vehicle is idling. |
| POSSIBLE CAUSE | • The malfunction is in the pressure solenoid or oil pump which causes a high-pitched noise to be emitted from the transaxle at idle.<br><br>**Note**<br>• If a noise is emitted during shifting only, the malfunction is in the C1 clutch, C2 clutch, C3 clutch or B1 brake.<br>• If a noise is emitted during shifting at certain gears only or during deceleration only, it is gear noise.<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect engine condition.<br>• Is there any engine concern (e.g. Rough idle)? | Yes | Go to appropriate symptom troubleshooting. (See 01-03-5 ENGINE SYMPTOM TROUBLESHOOTING[L3 WITH TC].) |
| | | No | Replace basic inspection and repair or replace any malfunctioning parts according to the inspection result |
| 2 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.21 NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL]

id050310802600

| 21 | Noise occurs at idle when vehicle is stopped in D range, or in R position |
|---|---|
| DESCRIPTION | • Transaxle is noisy in driving ranges when vehicle idling. |
| POSSIBLE CAUSE | • Although the malfunction is basically the same as No.20 “NOISE OCCURS AT IDLE WHEN VEHICLE IS STOPPED IN ALL POSITIONS/RANGES”, other causes may include selector lever position disparity or TR switch position disparity. |

### NO.22 NO ENGINE BRAKING IN 1GR POSITION OF M RANGE[AW6A-EL, AW6AX-EL]

id050310802700

| 22 | No engine braking in 1GR position of M range |
|---|---|
| DESCRIPTION | • Engine speed drops to idle but the vehicle coasts when the accelerator pedal is released during cruising at medium to high speeds.<br>• Engine speed drops to idle but the vehicle coasts when accelerator pedal is released when in M range (1GR) at low vehicle speed. |
| POSSIBLE CAUSE | • Clutch slippage, burnt (B2 brake)<br>— Line pressure low<br>• VSS malfunction<br>• Input/turbine speed sensor malfunction<br>• Shift solenoid A or B malfunction<br>• Sensor GND malfunction<br>• Control valve body malfunction<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Do the following symptoms occur concurrently?<br>— Engine flares up or slips during acceleration<br>— Engine flares up or slips when shifting | Yes | Go to No.14 “ENGINE FLARES UP OR SLIPS WHEN UPSHIFTING OR DOWNSHIFTING”, or No.15 “ENGINE FLARES UP OR SLIPS WHEN ACCELERATING VEHICLE”. |
| | | No | Go to the next step. |
| 2 | • Stop the engine.<br>• Inspect following solenoids. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>— Shift solenoid A<br>— Shift solenoid B<br>• Are the normal? | Yes | Inspect the ATF condition.<br>• If a large amount of metal specks are found, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If a large amount of metal specks are not found, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

## NO.23 TRANSAXLE OVERHEATS[AW6A-EL, AW6AX-EL]

id050310802800

| 23 | TRANSAXLE OVERHEATS |
|---|---|
| DESCRIPTION | • Burnt smell emitted from transaxle.<br>• Smoke emitted from transaxle. |
| POSSIBLE CAUSE | • The malfunction is restricted to the hindrance of coolant at the oil cooler. In addition, overheating of the transaxle may be caused by a malfunction of the TFT sensor.<br>— Line pressure low<br>• ATF level low<br>• Incorrect accelerator opening signal<br>— Oil cooler malfunction (Foreign material mixed in with ATF)<br>— TFT sensor malfunction<br>— Excessive amount of ATF<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is the line pressure normal? (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 2 | • Is stall speed normal? (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].) | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 3 | • Inspect the TFT sensor and related wiring harness: vibration, intermittent open/short circuit (See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace part if necessary. |
| 4 | • Inspect the line pressure control solenoid. (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | • Inspect for bending, damage, corrosion or kinks of the oil cooler pipes.<br>• Are oil cooler pipes normal? | Yes | Replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace any malfunctioning parts. |
| 6 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

## NO.24 ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION[AW6A-EL, AW6AX-EL]

id050310802900

| 24 | Engine stalls when shifted to D range, or in R position |
|---|---|
| DESCRIPTION | • Engine stalls when shifting from N or P position to D range or R position at idle. |
| POSSIBLE CAUSE | • The malfunction is on the engine control side (e.g. electronic controlled throttle system). Otherwise, the malfunction is in the input/turbine speed sensor (engine sometimes starts) or the TCC circuit (engine always stalls).<br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Go to symptom troubleshooting No.5 “ENGINE STALLS-AFTER START/AT IDLE”. (See 01-03-23 NO.5 ENGINE STALLS-AFTER START/AT IDLE[L3 WITH TC].)<br>• Is the engine control system normal? | Yes | Go to the next step. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 2 | • Remove the torque converter. (See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Inspect the torque converter.<br>• Is the torque converter normal? | Yes | Inspect for bending, damage, corrosion or kinks of the oil cooler pipes.<br>• If normal, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• If problem remains, replace the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| | | No | Replace the torque converter. |
| 3 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

## NO.25 ENGINE STALLS WHEN DRIVING AT SLOW SPEED OR STOPPING[AW6A-EL, AW6AX-EL]

id050310803000

| 25 | Engine stalls when driving at slow speeds or stopping |
|---|---|
| DESCRIPTION | • Engine stalls when the brake pedal is depressed while driving at low speed or stopping. |
| POSSIBLE CAUSE | • The malfunction is in the engine control system (e.g. Fuel injection control, electronic controlled throttle system)<br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Go to symptom troubleshooting No.10 “LOW IDLE/STALLS DURING DECELERATION”. (See 01-03-39 NO.10 LOW IDLE/STALLS DURING DECELERATION[L3 WITH TC].)<br>• Is the engine control system normal? | Yes | Go to No.24 “ENGINE STALLS WHEN SHIFTED TO D RANGE, OR IN R POSITION”. |
| | | No | Repair or replace any malfunctioning parts according to the inspection results. |
| 2 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

## NO.26 STARTER DOES NOT WORK[AW6A-EL, AW6AX-EL]

id050310803100

| 26 | Starter does not work |
|---|---|
| DESCRIPTION | • Starter does not work even when in P or N position. |
| POSSIBLE CAUSE | • Selector lever mis-adjustment<br>• TR switch malfunction<br>• N position learning is not performed.<br>• Transaxle operates in fail-safe function (Starter lock system related circuit open or short)<br>• Immobilizer system operating or system malfunction. |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Perform the N position learning. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)<br>• Does the problem eliminate? | Yes | Troubleshooting is completed. If the other symptom occurs, go to applicable troubleshooting procedure. |
| | | No | Go to the next step. |
| 2 | • Inspect the TR switch. (See 05-17-11 TRANSAXLE RANGE (TR) SWITCH INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is the TR switch normal? | Yes | Go to engine system troubleshooting No.3 “WILL NOT CRANK” troubleshooting procedure. |
| | | No | Replace the TR switch and perform initial learning procedure. (See 05-03-21 NO.17 EXCESSIVE SHIFT SHOCK FROM N TO D OR N TO R POSITION/RANGE[AW6A-EL, AW6AX-EL].) |
| 3 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

## NO.27 GEAR POSITION INDICATOR LIGHT DOES NOT ILLUMINATE IN M RANGE[AW6A-EL, AW6AX-EL]

id050310803200

| 27 | Gear position indicator light does not illuminate in M range |
|---|---|
| DESCRIPTION | • Gear position indicator light in instrument cluster does not illuminate in M range with the ignition switch at ON. |
| POSSIBLE CAUSE | • M range switch, gear position indicator light or related wiring harness malfunction<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Do other indicator lights illuminate with the ignition switch at ON? | Yes | Go to the next step. |
| | | No | Inspect the meter fuse. |
| 2 | • Inspect the voltage at the TCM terminal A7. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is the voltage normal? | Yes | Inspect the instrument cluster. |
| | | No | Inspect the M range switch. If the M range switch is normal, inspect for continuity between the M range switch and TCM terminal A7. |
| 3 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.28 GEAR POSITION INDICATOR LIGHT ILLUMINATES IN D RANGE OR P, N, R POSITIONS[AW6A-EL, AW6AX-EL]

id050310803300

| 28 | Gear position indicator light illuminates when in D range or P, N, R positions |
|---|---|
| DESCRIPTION | • Gear position indicator light in instrument cluster illuminates in D range or P, N, R position with the ignition switch at ON. |
| POSSIBLE CAUSE | • M range switch or related wiring harness malfunction<br><br>**Note**<br>• Before following the troubleshooting steps, make sure that the Automatic Transaxle On-Board Diagnostic and Automatic Transaxle Basic Inspection are conducted. (See 05-03-3 BASIC INSPECTION[AW6A-EL, AW6AX-EL].) |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the voltage at the TCM terminal A7. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].)<br>• Is the voltage normal? | Yes | Inspect the instrument cluster. |
| | | No | Inspect the M range switch.<br>If the M range switch is normal, inspect for continuity between the M range switch and TCM terminal A7. |
| 2 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.29 DOES NOT UPSHIFT IN M RANGE[AW6A-EL, AW6AX-EL]

id050310803400

| 29 | Does not upshift in M range |
|---|---|
| DESCRIPTION | • Gear position indicator light in instrument cluster illuminates, but the vehicle does not upshift when the selector lever is pushed to “+” side. |
| POSSIBLE CAUSE | • Up switch or related wiring harness malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Inspect the voltage at the TCM terminal A3. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].)<br>Is the voltage normal? | Yes | Inspect the instrument cluster. |
| | | No | Inspect the up switch.<br>• If the up switch is normal, inspect for continuity between the up switch and TCM terminal A3. |
| 2 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | | |

### NO.30 DOES NOT DOWNSHIFT IN M RANGE[AW6A-EL, AW6AX-EL]

id050310803500

| 30 | Does not downshift in M range |
|---|---|
| DESCRIPTION | • Gear position indicator light in instrument cluster illuminates, but the vehicle does not downshift when the selector lever is pushed to “–” side. |
| POSSIBLE CAUSE | • Down switch or related wiring harness malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | Inspect the voltage at the TCM terminal A4. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].)<br>Is the voltage normal? | Yes | Inspect the instrument cluster. |
| | | No | Inspect the down switch.<br>• If the down switch is normal, inspect for continuity between the down switch and TCM terminal A4. |

| STEP | INSPECTION | ACTION |
|---|---|---|
| 2 | • Verify test results.<br>— If normal, return to the diagnostic index to service any additional symptoms.<br>— If malfunction remains, inspect the related Service Bulletins and/or On-line Repair Information and perform repair or diagnosis.<br>• If the vehicle is repaired, troubleshooting completed.<br>• If the vehicle is not repaired or additional diagnostic information is not available, replace the TCM. | |

# 05-17 AUTOMATIC TRANSAXLE [AW6A-EL, AW6AX-EL]


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## AUTOMATIC TRANSAXLE LOCATION INDEX[AW6A-EL, AW6AX-EL]

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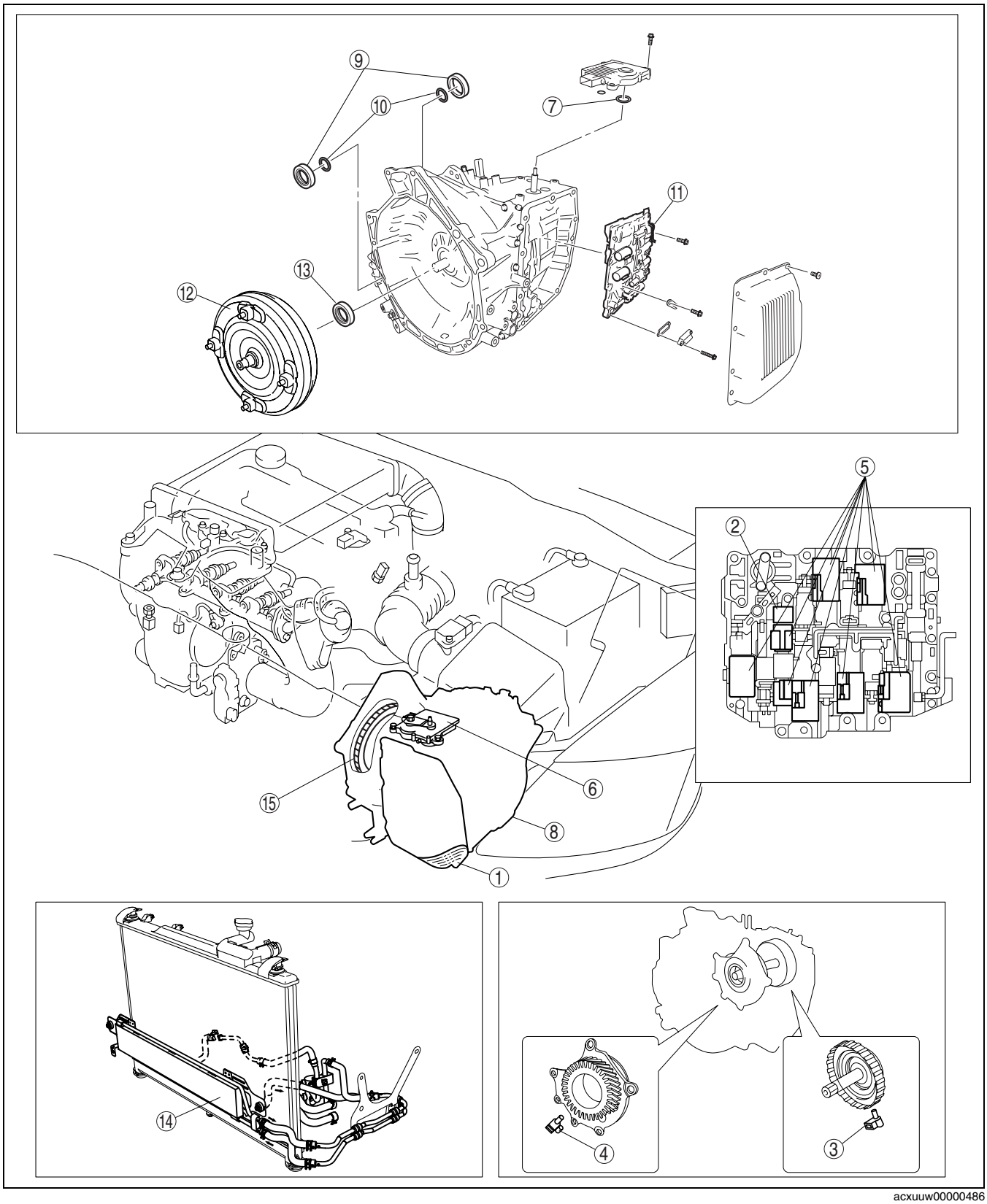


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| | |
|---|---|
| 1 | Automatic transaxle fluid (ATF)<br>(See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].) |

| | |
|---|---|
| 2 | Transaxle fluid temperature (TFT) sensor<br>(See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 3 | Input/turbine speed sensor<br>(See 05-17-15 INPUT/TURBINE SPEED SENSOR INSPECTION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-17 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 4 | Vehicle speed sensor<br>(See 05-17-18 VEHICLE SPEED SENSOR (VSS) INSPECTION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-19 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 5 | Solenoid valve<br>(See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL].) |
| 6 | TCM<br>(See 05-17-11 TRANSAXLE RANGE (TR) SWITCH INSPECTION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 7 | Oil seal (manual shaft)<br>(See 05-17-28 OIL SEAL (MANUAL SHAFT) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 8 | Automatic transaxle<br>(See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 9 | Oil seal (differential)<br>(See 05-17-35 OIL SEAL (DIFFERENTIAL) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 10 | Differential gear O-ring<br>(See 05-17-37 DIFFERENTIAL GEAR O-RING REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 11 | Control valve body<br>(See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 12 | Torque converter<br>(See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 13 | Oil seal (oil pump)<br>(See 05-17-45 OIL SEAL (OIL PUMP) REPLACEMENT[AW6A-EL, AW6AX-EL].) |
| 14 | Oil cooler<br>(See 05-17-47 OIL COOLER FLUSHING[AW6A-EL, AW6AX-EL].)<br>(See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)<br>(See 05-17-50 OIL COOLER DISASSEMBLY/ASSEMBLY[AW6A-EL, AW6AX-EL].) |
| 15 | Drive plate<br>(See 05-17-52 DRIVE PLATE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].) |



## MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL]

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### Mechanical System Test Preparation

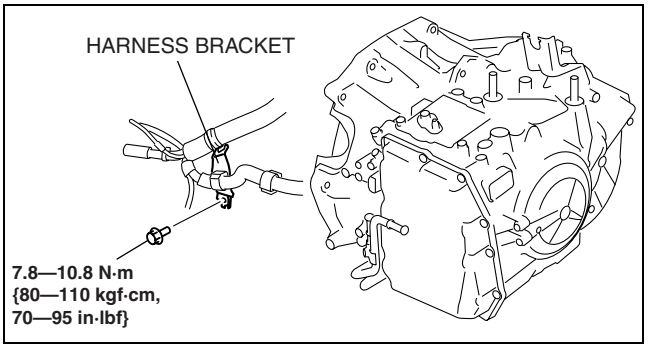
1. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
2. Inspect the engine coolant level. (See 01-12-2 COOLING SYSTEM SERVICE WARNINGS[L3 WITH TC].) (See 01-12-3 ENGINE COOLANT LEVEL INSPECTION[L3 WITH TC].)
3. Inspect the engine oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
4. Inspect the ATF level. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)
5. Inspect the idle speed. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)
6. Inspect the ignition timing. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)

### Line Pressure Test

1. Perform mechanical system test preparation. (See05-17-3 Mechanical System Test Preparation.)
2. Remove the harness bracket.

**Warning**

- **Removing the test plug when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the test plug, allow the ATF to cool.**

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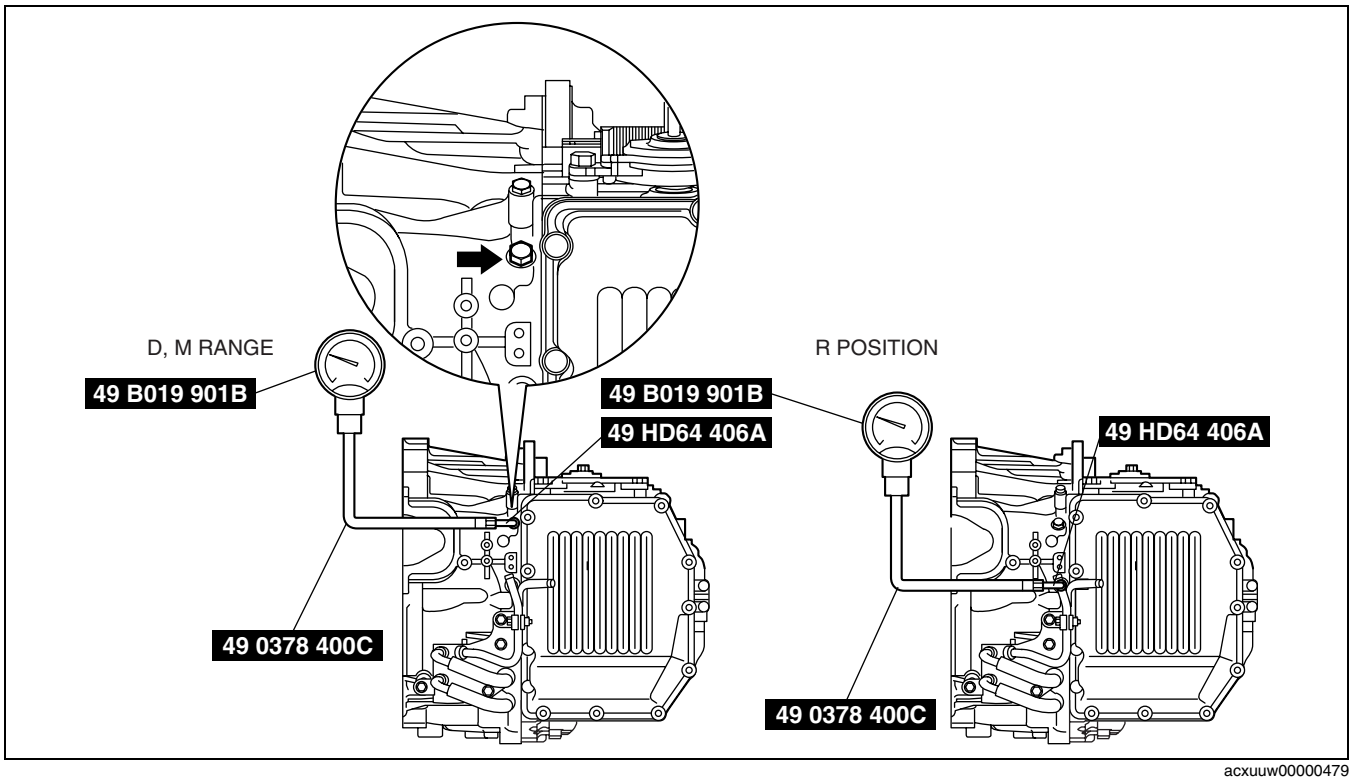
3. Connect the **SSTs (49 HD64 406A and, 49 0378 400C)** to the line pressure inspection port and replace the gauge of the **SST (49 0378 400C)** with the **SST (49 B019 901B)**.

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4. Start the engine and warm it up until the ATF reaches **60— 70 °C {140— 158 °F}**.
5. Shift the selector lever to the D range.

**Caution**
- **Perform the test at least 3 times and calculate the average.**

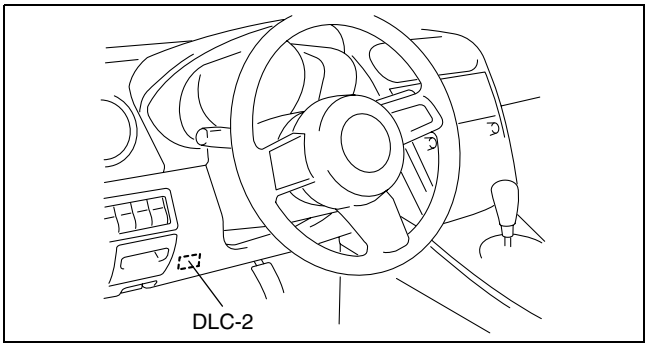
6. Read the line pressure while the engine is idling for the D range.
7. Read the line pressure while the engine is idling for the R position and M range in the same manner as in Steps 4— 5.

**Line pressure**

| Position/range | | Line pressure (kPa {kgf/cm$^2$, psi}) |
|---|---|---|
| D, M | Idle | 350— 410 {3.6— 4.1, 51— 59} |
| R | Idle | 580— 670 {6.0— 6.8, 85— 97} |

8. Stop the engine, then replace the **SST (49 B019 901B)** with the gauge of the **SST (49 0378 400C)**.
9. Connect the M-MDS to the DLC-2.
10. Measure the LPS PID value.
11. Start the engine.
12. Firmly depress the brake pedal with the left foot.
13. Shift the selector lever to the D range.

**Caution**
- **If the accelerator pedal is pressed for more than 5 s while the brake pedal is pressed, the transaxle could be damaged. Therefore, perform Steps 13 and 14 within 5 s.**

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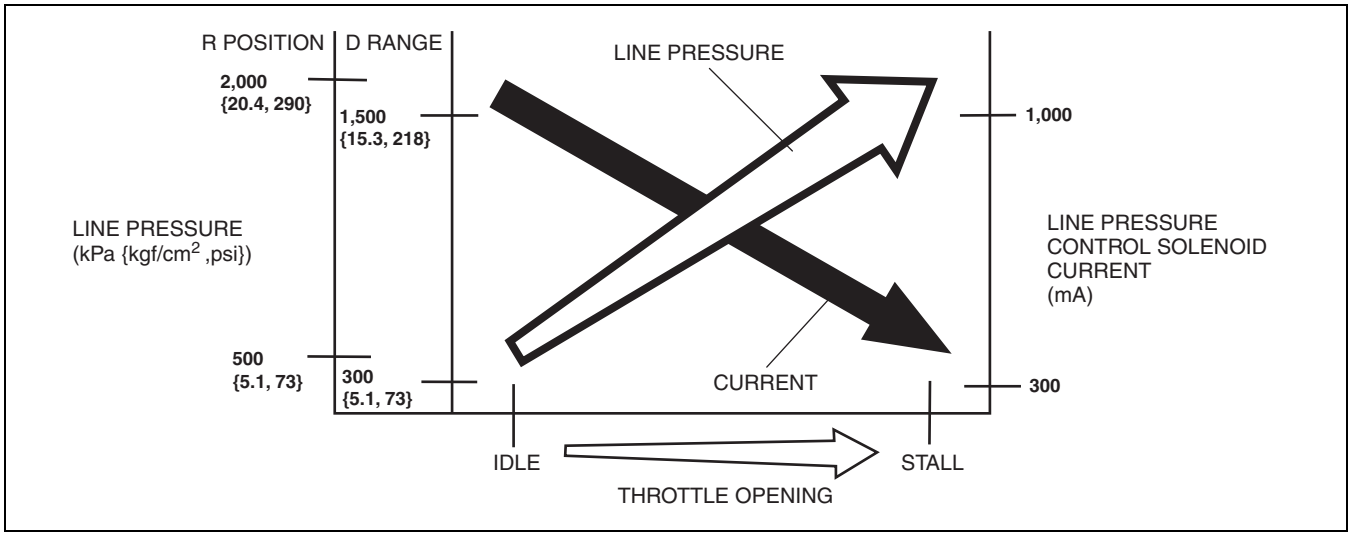
14. Gradually depress the accelerator pedal with the right foot.
15. When the engine speed no longer increases, quickly read the line pressure and release the accelerator pedal.
16. Shift the selector lever to the N position and idle the engine for **1 min or more** to cool the ATF.

17. Verify that the line pressure and LPS PID current values change according to the following graph by changing the shift throttle opening angle when shifting to the D range and R position with the engine running.
    — The line pressure standard other than when the engine is idling cannot be determined because the maximum line pressure for this automatic transaxle is controlled by vehicle conditions.

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**Warning**
- **Removing the SST when the ATF is hot can be dangerous. Hot ATF can come out of the opening and badly burn you. Before removing the SST, allow the ATF to cool.**

18. Remove the **SSTs.**
19. Install a test plug in the inspection port.

**Tightening torque**
**5.9— 8.8 N·m {61— 89 kgf·cm, 53— 77 in·lbf}**

**Line pressure test evaluation**

| Condition | Possible cause |
|---|---|
| Lower than specification in D range and R position | • Line pressure control solenoid malfunction<br>• Primary regulator valve malfunction<br>• Oil pump malfunction<br>• Oil leaking from D range or R position hydraulic circuit |
| Constant pressure without fluctuation in hydraulic pressure to throttle in D range and R position | • Line pressure control solenoid malfunction<br>• Control valve body internal malfunction |
| Current to throttle does not change in D range and R position | • TCM internal malfunction<br>• Connector malfunction |
| Hydraulic pressure in R position is not higher than D range | • Primary regulator valve malfunction |

**Stall Test**
1. Perform mechanical system test preparation. (See 05-17-3 Mechanical System Test Preparation.)
2. Start the engine.
3. Firmly depress the brake pedal with the left foot.
4. Shift the selector lever to the D range.

**Caution**
- **If the accelerator pedal is depressed for more than 5 s while the brake pedal is depressed, the transaxle could be damaged. Therefore, perform Steps 5 and 6 within 5 s.**
- **Perform the test at least 3 times and calculate the average.**

5. Gently depress the accelerator pedal with the right foot.
6. When the engine speed no longer increases, quickly read the engine speed and release the accelerator pedal.
7. Shift the selector lever to the N position and idle the engine for **1 min or more** to cool the ATF.
8. Perform a stall test of the M range and R position in the same manner as in Steps 3— 7.
9. Turn off the engine.

**Engine stall speed**

| Position/range | Engine stall speed (rpm) |
|---|---|
| D, M | 2,800 |
| R | |

**Evaluation of stall test**

| Condition | | Possible cause |
|---|---|---|
| Above specification | In D, M ranges | • Low line pressure (Line pressure control solenoid malfunction, primary regulator valve malfunction)<br>• Control valve body component malfunction (shift solenoid C hydraulic pressure system)<br>• C1 clutch slipping<br>• One-way clutch malfunction |
| | In R position | • Low line pressure (Line pressure control solenoid malfunction, primary regulator valve malfunction)<br>• Control valve body component malfunction (shift solenoid E hydraulic pressure system)<br>• C3 clutch malfunction (slipping)<br>• B2 brake malfunction (slipping) |
| | In all positions/ranges | • Low line pressure (Line pressure control solenoid malfunction, primary regulator valve malfunction)<br>• Oil pump malfunction<br>• Oil strainer clogging |
| Below specification | | • Engine lack of power<br>• Torque converter one-way clutch slipping |

**Time Lag Test**

1. Perform mechanical system test preparation. (See05-17-3 Mechanical System Test Preparation.)
2. Start the engine.
3. Warm up the engine until the ATF temperature reaches **60— 70°C {140— 158°F}**.
4. Shift the selector lever from the N position to D range.
5. Use a stopwatch to measure the time it takes from shifting until shock is felt. Take three measurements for each test and average from the results using the following formula.

   **Formula**
   **Average time lag = (Time 1 + Time 2 + Time 3) / 3**

6. Perform the test for the following shifts in the same manner as in Step 5.
   - N position → R position

   **Average time lag**
   **N position → D range: 1.5 s or less**
   **N position → R position: 1.5 s or less**

**Evaluation of time lag test**

| Condition | | Possible cause |
|---|---|---|
| N→D shift | More than specification | • Control valve body malfunction (shift solenoid C hydraulic pressure system)<br>• C1 clutch slipping<br>• One-way clutch malfunction<br>• Oil pump malfunction<br>• Oil strainer clogging |
| N→R shift | More than specification | • Control valve body malfunction (shift solenoid E hydraulic pressure system)<br>• C3 clutch slipping<br>• B2 brake slipping<br>• Oil pump malfunction<br>• Oil strainer clogging |

## ROAD TEST[AW6A-EL, AW6AX-EL]

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**Warning**

- **When performing a road test, be aware of other vehicles, people, and other impediments in order to avoid an accident.**

**Note**

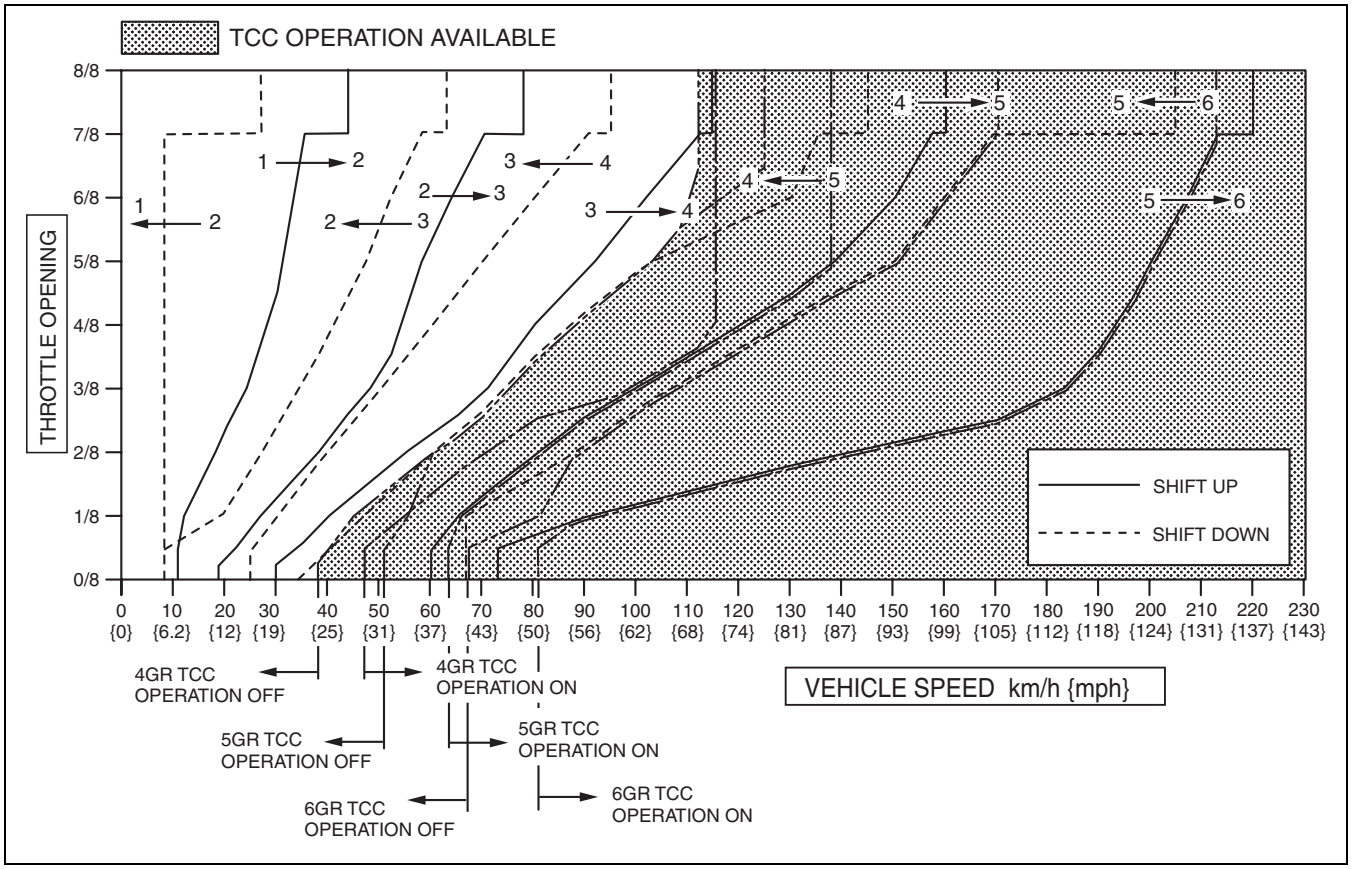
- When the legal speed limit must be exceeded, use a chassis dynamometer instead of performing a road test.

### Road Test Preparation

1. Inspect the engine coolant level. (See 01-12-2 COOLING SYSTEM SERVICE WARNINGS[L3 WITH TC].) (See 01-12-3 ENGINE COOLANT LEVEL INSPECTION[L3 WITH TC].)
2. Inspect the engine oil level. (See 01-11-3 ENGINE OIL LEVEL INSPECTION[L3 WITH TC].)
3. Inspect the ATF level. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)
4. Inspect the idle speed. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)
5. Inspect the ignition timing. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)
6. Bring up the engine and transaxle to normal operating temperature.



### Shift Diagram
### D range (normal mode)

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**D Range Test**

1. Perform road test preparation. (See05-17-7 Road Test Preparation.)
2. Shift the selector lever to D range.
3. Accelerate with the depressing amount of accelerator pedal half and then fully depress.
4. Verify that 1→2, 2→3, 3→4, 4→5, and 5→6 upshifts and downshifts are obtained. The shift points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)
5. Drive the vehicle in 6GR, 5GR, 4GR, 3GR, and 2GR and verify that kickdown occurs for 6→5, 5→4, 4→3, 3→2, 2→1 downshifts, and that the shift points are as shown in the table below.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)
6. Drive the vehicle and verify that TCC operation is obtained. The operation points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)

**Vehicle speed at shift point table**

| Range | Mode | Throttle condition | Shift | Vehicle speed (km/h {mph}) | Turbine speed (rpm) |
|---|---|---|---|---|---|
| D | NORMAL | Wide open throttle | $D_1 \rightarrow D_2$ | 43— 49 {27— 30} | 5,100— 5,750 |
| | | | $D_2 \rightarrow D_3$ | 76— 84 {48— 52} | 5,150— 5,650 |
| | | | $D_3 \rightarrow D_4$ | 112— 122 {70— 75} | 4,950— 5,350 |
| | | | TCC ON ($D_4$) | 112— 122 {70— 75} | 3,700— 4,000 |
| | | | $D_4 \rightarrow D_5$ | 157— 167 {98— 103} | 5,150— 5,450 |
| | | | TCC ON ($D_5$) | 135— 145 {84— 89} | 3,300— 3,500 |
| | | | $D_5 \rightarrow D_6$ | 217— 227 {135— 140} | 5,300— 5,500 |
| | | | TCC ON ($D_6$) | 210— 220 {131— 136} | 4,100— 4,250 |
| | | Half throttle | $D_1 \rightarrow D_2$ | 24— 31 {15— 19} | 2,800— 3,650 |
| | | | $D_2 \rightarrow D_3$ | 46— 60 {29— 37} | 3,100— 4,050 |
| | | | $D_3 \rightarrow D_4$ | 70— 93 {44— 57} | 3,100— 4,100 |
| | | | TCC ON ($D_4$) | 97— 118 {61— 73} | 3,200— 3,850 |
| | | | $D_4 \rightarrow D_5$ | 106— 132 {66— 81} | 3,500— 4,350 |
| | | | TCC ON ($D_5$) | 106— 132 {66— 81} | 2,600— 3,200 |
| | | | $D_5 \rightarrow D_6$ | 181— 202 {113— 125} | 4,450— 4,900 |
| | | | TCC ON ($D_6$) | 181— 202 {113— 125} | 3,550— 3,900 |
| | | Closed throttle position | $D_6 \rightarrow D_5$ | 64— 70 {40— 43} | 1,250— 1,350 |
| | | | $D_5 \rightarrow D_4$ | 31— 37 {20— 22} | 800— 900 |
| | | | $D_4 \rightarrow D_3$ | 22— 28 {14— 17} | 750— 900 |
| | | | $D_3 \rightarrow D_1$ | 5— 11 {4— 6} | 250— 450 |
| | | | $D_2 \rightarrow D_1$ | 5— 11 {4— 6} | 350— 700 |
| | | Kickdown | $D_6 \rightarrow D_5$ | 200— 210 {124— 130} | 3,900— 4,050 |
| | | | $D_5 \rightarrow D_4$ | 140— 150 {87— 93} | 3,450— 3,650 |
| | | | $D_4 \rightarrow D_3$ | 90— 100 {56— 62} | 3,000— 3,250 |
| | | | $D_3 \rightarrow D_2$ | 59— 67 {37— 41} | 2,650— 2,950 |
| | | | $D_2 \rightarrow D_1$ | 24— 30 {15— 18} | 1,650— 2,000 |

| Range | Mode | Throttle condition | Shift | Vehicle speed (km/h {mph}) | Turbine speed (rpm) |
|---|---|---|---|---|---|
| D | POWER | Wide open throttle | $D_1 \rightarrow D_2$ | 43— 49 {27— 30} | 5,100— 5,750 |
| | | | $D_2 \rightarrow D_3$ | 82— 90 {51— 55} | 5,550— 6,050 |
| | | | $D_3 \rightarrow D_4$ | 127— 137 {79— 84} | 5,650— 6,050 |
| | | | TCC ON ($D_4$) | 127— 137 {79— 84} | 4,200— 4,450 |
| | | | $D_4 \rightarrow D_5$ | 167— 177 {104— 109} | 5,500— 5,800 |
| | | | TCC ON ($D_5$) | 167— 177 {104— 109} | 4,100— 4,300 |
| | | Half throttle | $D_1 \rightarrow D_2$ | 24— 32 {15— 19} | 2,850— 3,750 |
| | | | $D_2 \rightarrow D_3$ | 51— 64 {32— 39} | 3,400— 4,350 |
| | | | $D_3 \rightarrow D_4$ | 83— 107 {52— 66} | 3,700— 4,700 |
| | | | TCC ON ($D_4$) | 121— 139 {76— 86} | 4,000— 4,550 |
| | | | $D_4 \rightarrow D_5$ | 144— 165 {90— 102} | 4,750— 5,400 |
| | | | TCC ON ($D_5$) | 161— 179 {100— 110} | 3,950— 4,350 |
| | | Closed throttle position | $D_6 \rightarrow D_5$ | 117— 123 {73— 76} | 2,300— 2,350 |
| | | | $D_5 \rightarrow D_4$ | 42— 48 {27— 29} | 1050— 1,150 |
| | | | $D_4 \rightarrow D_3$ | 22— 28 {14— 17} | 750— 900 |
| | | | $D_3 \rightarrow D_1$ | 5— 11 {4— 6} | 250— 450 |
| | | | $D_2 \rightarrow D_1$ | 5— 11 {4— 6} | 350— 700 |
| | | Kickdown | $D_6 \rightarrow D_5$ | 205— 215 {128— 133} | 4,000— 4,150 |
| | | | $D_5 \rightarrow D_4$ | 149— 159 {93— 98} | 3,650— 3,850 |
| | | | $D_4 \rightarrow D_3$ | 90— 100 {56— 62} | 3,000— 3,250 |
| | | | $D_3 \rightarrow D_2$ | 63— 71 {40— 44} | 2,800— 3,100 |
| | | | $D_2 \rightarrow D_1$ | 26— 32 {17— 19} | 1,800— 2,150 |



**M Range Test**

1. Perform road test preparation. (See05-17-7 Road Test Preparation.)
2. Shift the selector lever to M range.
3. Verify that 1→2, 2→3, 3→4, 4→5 and 5→6 upshifts and 6→5, 5→4, 4→3, 3→2, and 2→1 downshifts are obtained by manual shifting of the selector lever forward and back.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)
4. Decelerate the vehicle and verify that 6→5, 5→4, 4→3, 3→1 downshifts are obtained. The shift points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)
5. Decelerate the vehicle and verify that engine braking effect is felt in 1GR.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)
6. Drive the vehicle and verify that TCC operation is obtained in 4GR, 5GR and 6GR. The operation points must be as shown in the table below.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)
7. Drive the vehicle in 6GR, 5GR, 4GR and 3GR and verify that kickdown occurs for 6→5, 5→4, 4→3, 3→2 downshifts, and that the shift points are as shown in the table below.
   - If there is any malfunction, inspect the TCM and ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)

**Vehicle speed at shift point table**

| Range | Mode | Throttle condition | Shift | Vehicle speed km/h {mph} | Turbine speed (rpm) |
|---|---|---|---|---|---|
| M | Manual | Half throttle | TCC ON ($M_6$) | 185— 198 {115— 122} | 3,600— 3,850 |
| | | All round | $M_6 \rightarrow M_5$ | 49— 55 {31— 34} | 1,000— 1,050 |
| | | | $M_5 \rightarrow M_4$ | 31— 37 {20— 22} | 800— 900 |
| | | | $M_4 \rightarrow M_3$ | 22— 28 {14— 17} | 750— 900 |
| | | | $M_3 \rightarrow M_1$ | 5— 11 {4— 6} | 250— 450 |
| | | | $M_2 \rightarrow M_1$ | 5— 11 {4— 6} | 350— 700 |
| | | Kickdown | $M_6 \rightarrow M_5$ | 215— 225 {134— 139} | 4,200— 4,350 |
| | | | $M_5 \rightarrow M_4$ | 45— 55 {28— 34} | 1,100— 1,300 |
| | | | $M_4 \rightarrow M_3$ | 25— 35 {16— 21} | 850— 1,100 |
| | | | $M_3 \rightarrow M_2$ | 4— 12 {3— 7} | 200— 500 |
| | | | $M_2 \rightarrow M_1$ | 5— 11 {4— 6} | 350— 700 |

**P Position Test**

1. Shift into P position on a gentle slope. Release the brake and verify that the vehicle does not roll.
   - If there is any malfunction, inspect the ATX. (See 05-03-4 SYMPTOM TROUBLESHOOTING ITEM TABLE[AW6A-EL, AW6AX-EL].)

## AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL]

id051723800500

**Automatic Transaxle Fluid (ATF) Condition Inspection**

1. Inspect the ATF for the following to determine whether the transaxle should be disassembled.
   - The ATF is muddy.
   - The ATF smells strange or unusual.

**ATF Condition**

| Condition | | | Possible cause |
|---|---|---|---|
| Clear dark red | | Normal | — |
| Light red (pink) | | Contaminated with water | • Damaged oil cooler<br>• Poor filler tube installation:<br>Problem could occur to parts inside the transaxle due to water contamination.<br>If necessary, replace the transaxle. |
| Reddish brown | Has burnt smell and metal particles are found | Deteriorated ATF | Defective powertrain components inside the transaxle: Particles cause wide range of problems by clogging the oil pipe, control valve body and oil cooler.<br>• A large amount of metal particles are found. If necessary, replace the transaxle.<br>• Flush the system due to possible clogging of the oil pipe or oil cooler. |
| | Has no burnt smell | Normal | • Discoloration by oxidation |

**Automatic Transaxle Fluid (ATF) Level Inspection**

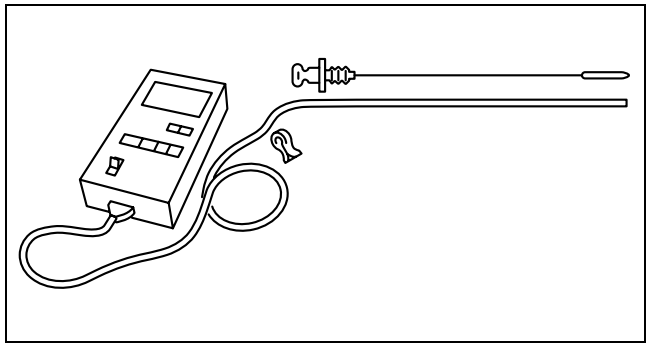
**Caution**

- **The ATF amount varies according to ATF temperature. Therefore, when checking the ATF level or replacing the ATF, use a thermometer to measure the temperature and adjust the ATF amount to the specified level according to the specified temperature.**

1. Place the vehicle on level ground.
2. Apply the parking brake and position wheel chocks securely to prevent the vehicle from rolling.

3. Adjust the length or thermometer probe so that the length is the same as the depth gauge, and hold the probe with a paper holder. Insert into the filler tube and measure the temperature.
   - If necessary, inspect the ATF before warming up the engine. In this case, use the ATF temperature **(15— 25 °C {59— 77 °F}).**
4. Warm up the engine until the ATF reaches **60— 70 °C {140— 158 °F}.**
5. Shift the selector lever and pause momentarily in each range (P— D) while depressing the brake pedal.
6. Shift the selector lever to P position.
7. Verify that the ATF level is in the HOT range **(65 °C {149 °F})** while the engine is idling.
   - If necessary, add ATF to the specification.

**ATF type**
**JWS3309**



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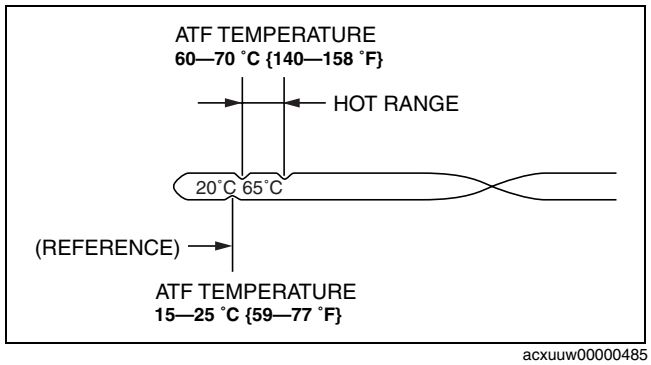


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## AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL]

id051723800600

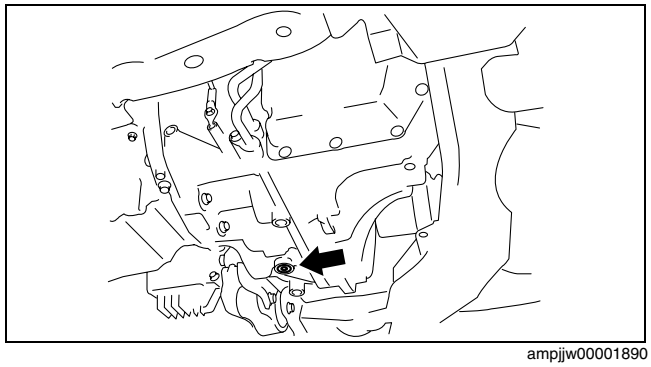
**Warning**
- **A hot transaxle and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing the ATF.**

1. Remove the oil dipstick.
2. Remove the under cover.
3. Remove the oil drain plug and gasket.
4. Drain the ATF into a container.
5. Install a new gasket and the drain plug.

**Tightening torque**
**23.5— 54.9 N·m {2.4— 5.5 kgf·m, 17.4— 40.4 ft·lbf}**

6. Add the specified ATF through the oil filler tube until it reaches the lower notch of dipstick.

**ATF**
**Type: JWS3309**
**Capacity (Approx. quantity): 7.0 L {7.4 US qt, 6.2 Imp qt}**



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7. Install the under cover.
8. Ensure that the ATF level is in the HOT range (**65 °C {149 °F}**).
   - Add ATF to the specified level as necessary.

## TRANSAXLE RANGE (TR) SWITCH INSPECTION[AW6A-EL, AW6AX-EL]

id051723800900

**Note**
- TR switch function is installed as one part of TCM.

1. Inspect the TCM. (See 05-17-21 TCM INSPECTION[AW6A-EL, AW6AX-EL].)

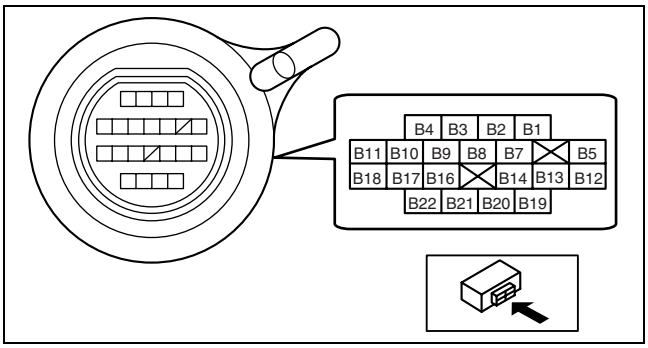
## TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL]

id051723801000

### On-Vehicle Inspection

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Verify that there is no continuity between coupler component terminals B7 and GND, or B8 and GND.
   - If there is any malfunction, perform an off-vehicle inspection of TFT sensor. (See 05-17-12 Off-Vehicle Inspection.)
5. Install the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
7. Connect the negative battery cable.

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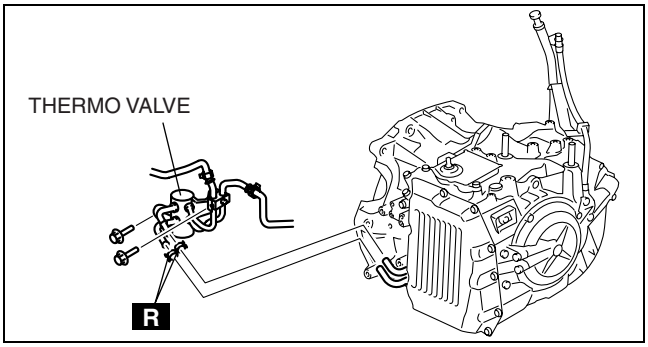
### Off-Vehicle Inspection

**Warning**
- **A hot transaxle and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing the ATF.**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
5. Remove the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Remove the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
8. Remove the TFT sensor. (See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

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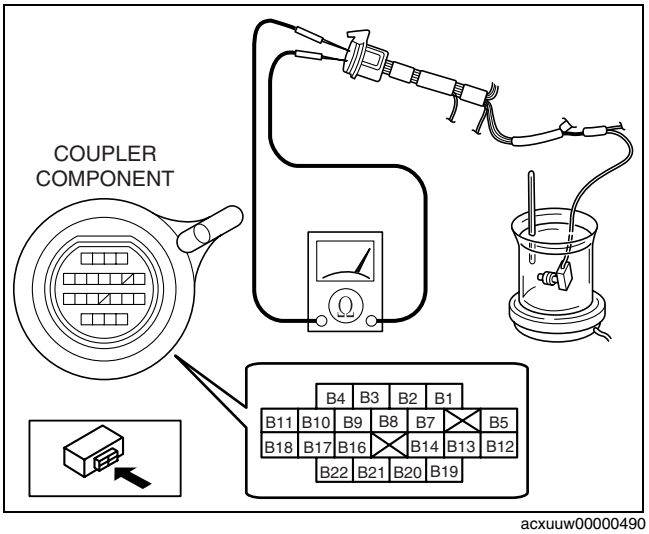
9. Place the TFT sensor and a thermometer in ATF as shown in the figure, and heat the ATF gradually.
10. Measure the resistance between the coupler component terminals B7and B8.
    - If there is any malfunction, replace the TFT sensor. (See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)

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**Transaxle fluid temperature (TFT) sensor**

| ATF temperature (°C {°F}) | Resistance (kilohm) |
|---|---|
| 10 {50} | 5.62— 7.31 |
| 25 {77} | Approx. 3.5 |
| 110 {230} | 0.22— 0.27 |

11. Install the TFT sensor. (See 05-17-13 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
12. Install the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
13. Install the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
14. Install the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
15. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
16. Install the under cover.
17. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
18. Connect the negative battery cable.

**TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

id051723801100

**Warning**

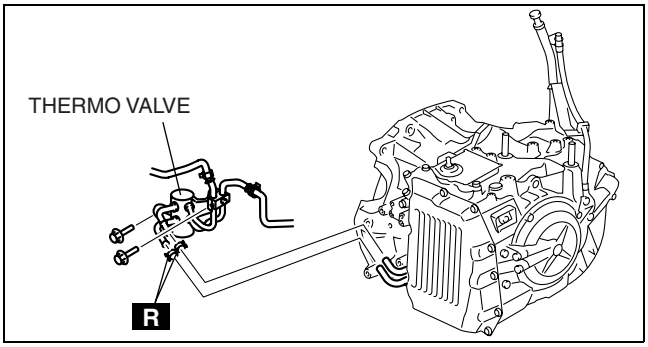
- **A hot transaxle and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing the ATF.**

**Caution**

- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
5. Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Remove the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)

7. Remove the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
8. Remove the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)



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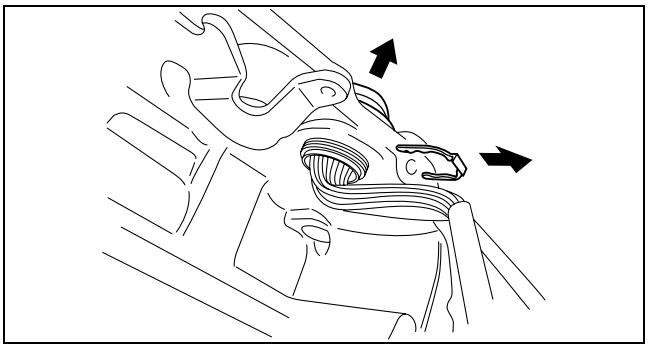
9. Remove the coupler component lock plate.

**Caution**
- **Do not damage the wiring harness.**
- **Do not pull hard on the wiring harness.**

10. Remove the coupler component from the transaxle case.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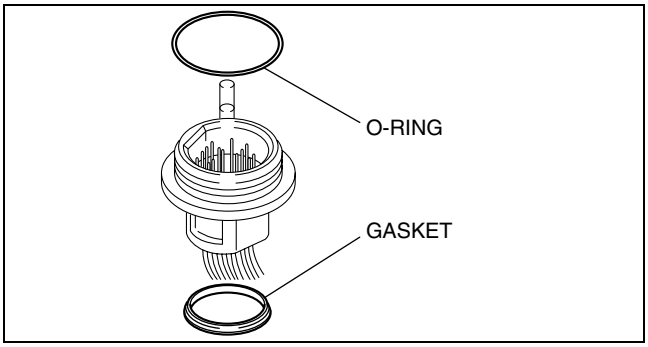
11. Remove the O-ring and the gasket from the coupler component.
12. Apply ATF to a new gasket and install it on the coupler component.

**Caution**
- **Do not apply ATF to the O-ring.**



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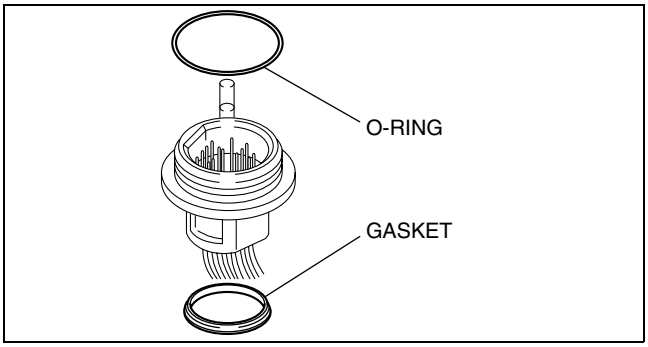
13. Install a new O-ring to the coupler component.

**Caution**
- **Do not apply too much force to the coupler component.**
- **Do not damage the coupler component.**

14. Install the coupler component to the transaxle case.



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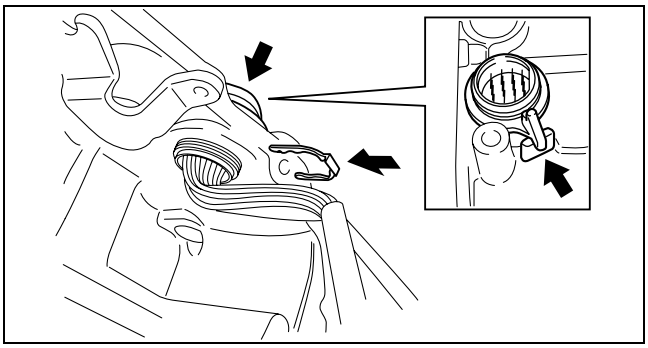
15. Install a new coupler component lock plate.
16. Install the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
17. Install the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
18. Install the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
19. Install the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)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20. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
21. Install the under cover.
22. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
23. Connect the negative battery cable.
24. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

**INPUT/TURBINE SPEED SENSOR INSPECTION[AW6A-EL, AW6AX-EL]**

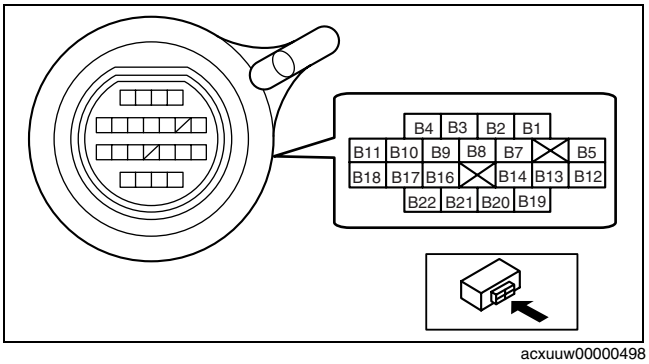
id051723801200

**On-Vehicle Inspection**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Verify that there is no continuity between the coupler component terminals B12 and GND or B13 and GND.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, perform an off-vehicle inspection of input/turbine speed sensor. (See05-17-16 Off-Vehicle Inspection.)

   **Note**
   - Inspect with a tester that can indicate **more than 10 megohms** and confirm that the value is **more than 1 megohm**.



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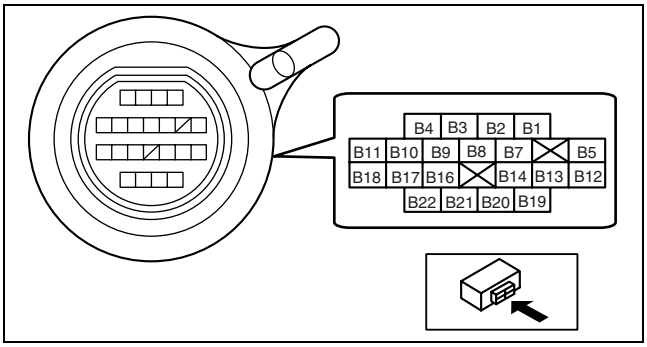
5. Verify that there is continuity between coupler component terminals B12 and B13.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the input/turbine speed sensor. (See 05-17-17 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Install the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
8. Connect the negative battery cable.



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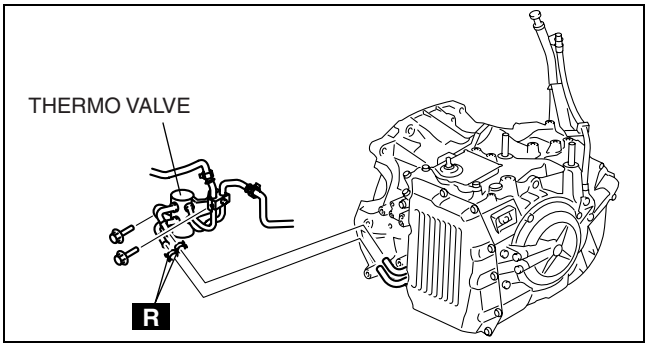
**Off-Vehicle Inspection**

**Warning**
- **A hot transaxle and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing the ATF.**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
5. Remove the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Remove the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
8. Remove the input/turbine speed sensor. (See 05-17-17 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)



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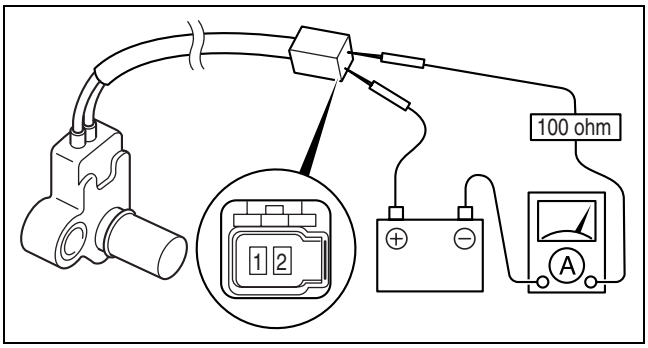
9. Connect the input/turbine speed sensor terminal 2 to the battery positive terminal, connect the battery negative terminal to input/turbine speed sensor terminal 1 through an ammeter set to a resistance of **100 ohm**.



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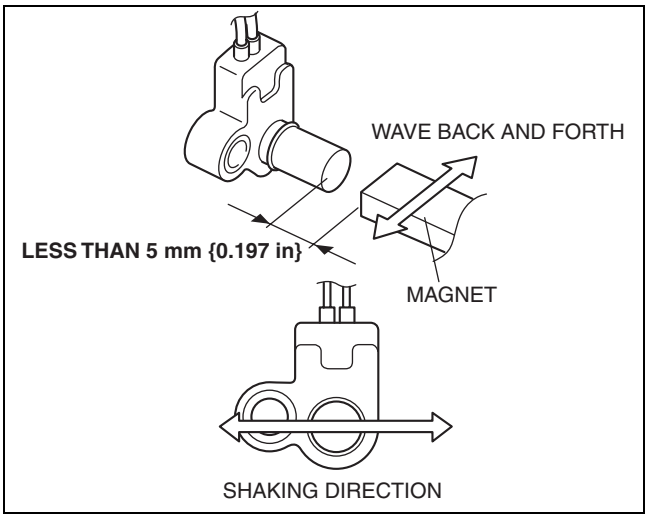
10. Measure the current while waving a magnet back and forth over the top of the input/turbine speed sensor (**less than 5 mm {0.197 in}).**
    - If there is any malfunction, replace the input/turbine speed sensor. (See 05-17-17 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)



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**Input/turbine speed sensor**

| Signal | Current (mA) |
|---|---|
| High | 12.0— 16.0 |
| Low | 4.0— 8.0 |

11. Install the input/turbine speed sensor. (See 05-17-17 INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
12. Install the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
13. Install the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
14. Install the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
15. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
16. Install the under cover.
17. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
18. Connect the negative battery cable.
19. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)



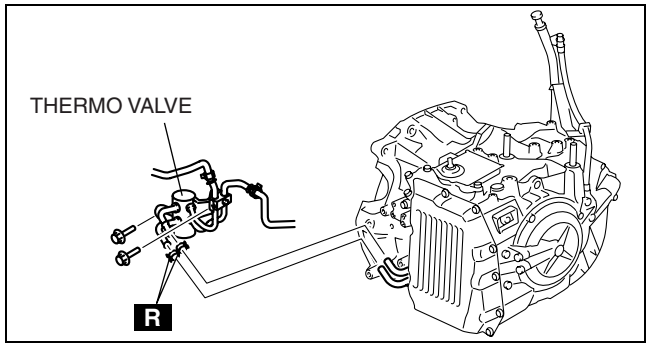
**INPUT/TURBINE SPEED SENSOR REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

id051723801300

**Warning**
- **A hot transaxle and ATF can cause severe burns. Turn off the engine and wait until then are cool before replacing the ATF.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
5. Remove the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Remove the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

**Caution**
- **Do not damage the input/turbine speed sensor.**

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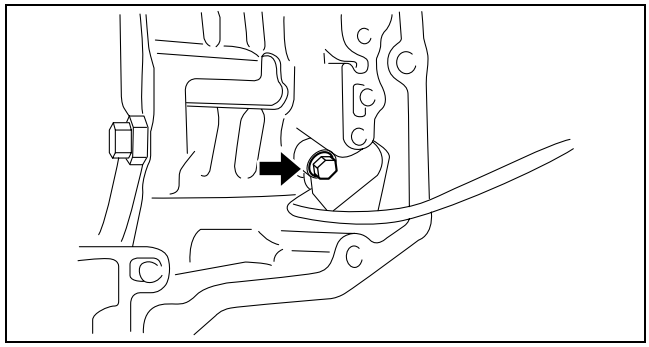
8. Remove the input/turbine speed sensor.
9. Install the input/turbine speed sensor.

**Tightening torque**
**3.9— 6.9 N·m {40— 70 kgf·cm, 26— 60 in·lbf}**



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10. Install the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
11. Install the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
12. Install the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
13. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
14. Install the under cover.

15. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
16. Connect the negative battery cable.
17. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

**VEHICLE SPEED SENSOR (VSS) INSPECTION[AW6A-EL, AW6AX-EL]**

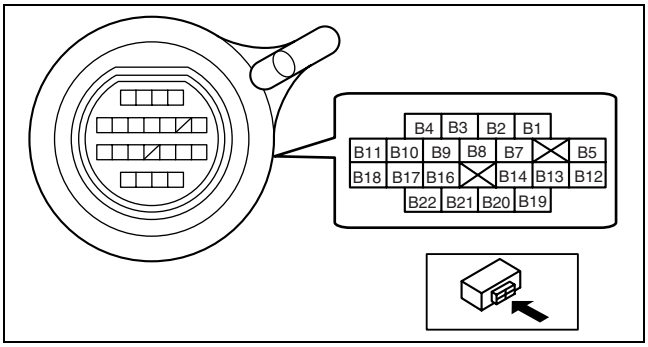
id051723801400

**On-Vehicle Inspection**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the TCM. (See05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Verify that there is no continuity between the coupler component terminals B19 and GND or B20 and GND.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the ATX. (See05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)

   **Note**
   - Inspect with a tester that can indicate**more than 10 megohms** and confirm that the value is **more than 1 megohm**.



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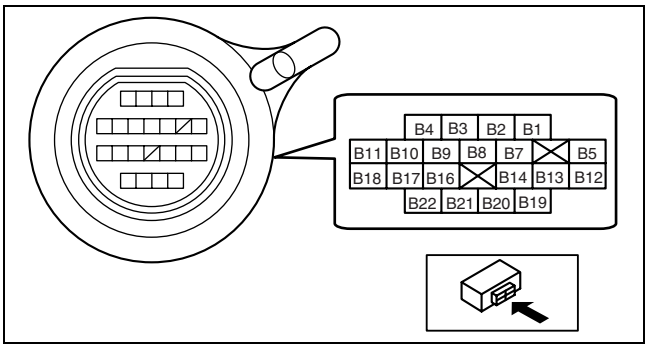
5. Verify that there is continuity between coupler component terminals B19 and B20.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the ATX. (See05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Install the TCM. (See05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Install the air cleaner component. (See01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
8. Connect the negative battery cable.



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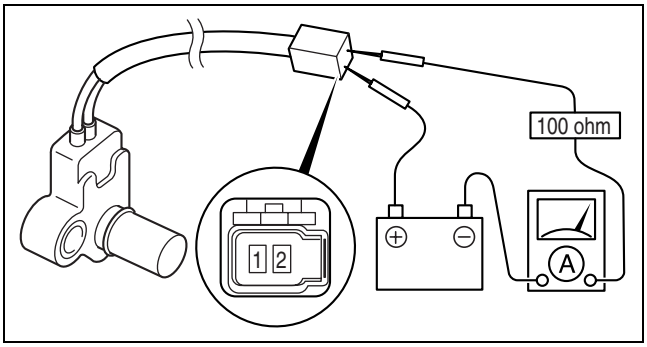
**Off-Vehicle Inspection**

**Warning**
- **A hot transaxle and ATF can cause severe burns. Turn off the engine and wait until they are cool before replacing the ATF.**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the VSS. (See05-17-19 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

3. Connect the VSS terminal 2 to the battery positive terminal, connect the battery negative terminal to VSS terminal 1 through an ammeter set to a resistance of **100 ohm.**

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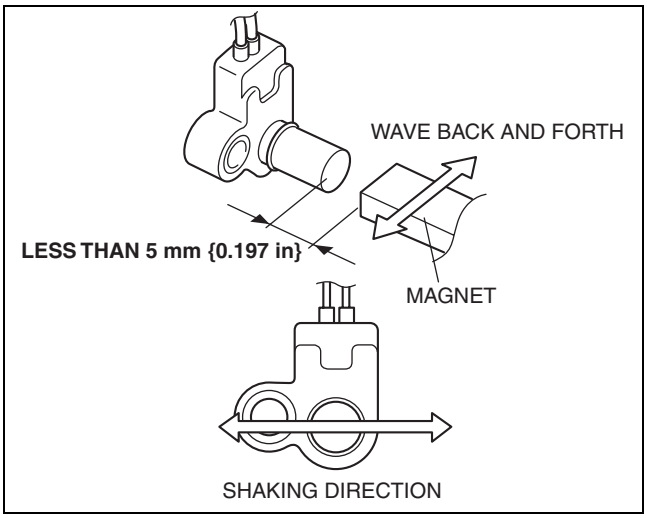
4. Measure the current while waving a magnet back and forth over the top of the VSS (**less than 5 mm {0.197 in}).**
   - If there is any malfunction, replace the VSS. (See05-17-19 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

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**VSS**

| Signal | Current (mA) |
|---|---|
| High | 12.0— 16.0 |
| Low | 4.0— 8.0 |

5. Install the VSS. (See05-17-19 VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Connect the negative battery cable.
7. Perform the mechanical system test. (See05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

**VEHICLE SPEED SENSOR (VSS) REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

id051723806100

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to drop water or foreign material on the connector when disconnecting it.**
- **If foreign materials are stuck to the VSS, disturbance by magnetic flux can cause sensor output to be abnormal and thereby negatively affect control. Make sure that foreign materials such as iron filings are not stuck to the VSS during installation.**

1. Remove the automatic transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
2. Remove the VSS. (See Automatic Transaxle and Transfer Workshop Manual AW6A-EL, AW6AX-EL)

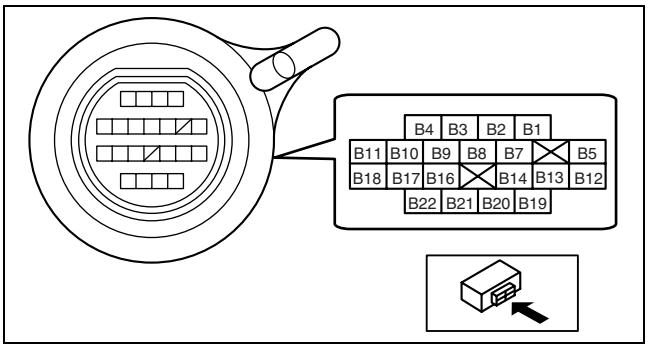
**SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]**

id051723801900

**Resistance Inspection (On-Vehicle Inspection)**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Measure the resistance between the following terminals.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)

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**Solenoid valve resistance (ATF temperature: 20 C {68 F})**

| Terminal | Solenoid valve | Resistance (ohm) |
|---|---|---|
| B5— GND | Shift solenoid A | 11— 15 |
| B2— GND | Shift solenoid B | 11— 15 |
| B11— B10 | Shift solenoid C | 5.0— 5.6 |
| B17— B18 | Shift solenoid D | 5.0— 5.6 |
| B14— B22 | Shift solenoid E | 5.0— 5.6 |
| B21— B16 | Shift solenoid F | 5.0— 5.6 |
| B9— B4 | TCC control solenoid | 5.0— 5.6 |
| B3— B1 | Line pressure control solenoid | 5.0— 5.6 |

5. Install the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
7. Connect the negative battery cable.

**Continuity Inspection (On-Vehicle Inspection)**

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**
- **Do not damage the terminals.**

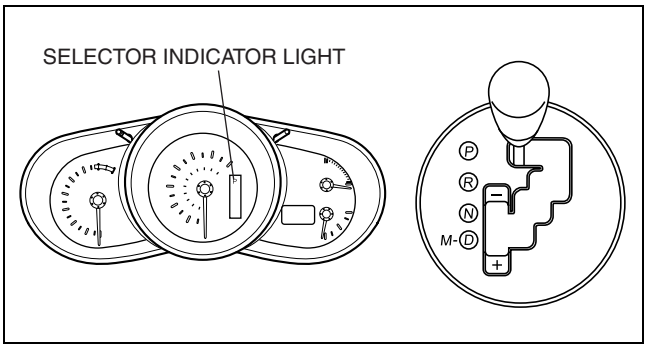
1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Verify that there is no continuity between coupler component terminals B1, B3, B4, B9, B10, B11, B14, B17, B18, B21, B22 and GND.
   - If there is any malfunction, inspect the coupler component.
   - If the coupler component is normal, replace the control valve body. (See 05-17-38 CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
5. Install the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
7. Connect the negative battery cable.

## TCM INSPECTION[AW6A-EL, AW6AX-EL]

id051723800300

### TR Switch Operating Inspection

1. Verify that the starter operates only when the ignition switch is turned to the START position with the selector lever in P or N position.
   - If there is any malfunction, neutral position learning. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
2. Verify that the back-up lights illuminate when shifted to R position with the ignition switch at the ON position.
   - If there is any malfunction, neutral position learning. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
3. Verify that the positions of the selector lever and the indicator light correspond.
   - If there is any malfunction, perform the neutral position learning. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Verify that the TR PID is normal.
   - If there is any malfunction, perform the neutral position learning. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

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### Control Module Inspection

1. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
2. Measure the voltage at each TCM connector (wiring harness-side) terminal and refer to the terminal voltage table.
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under “Inspection item (s)”.

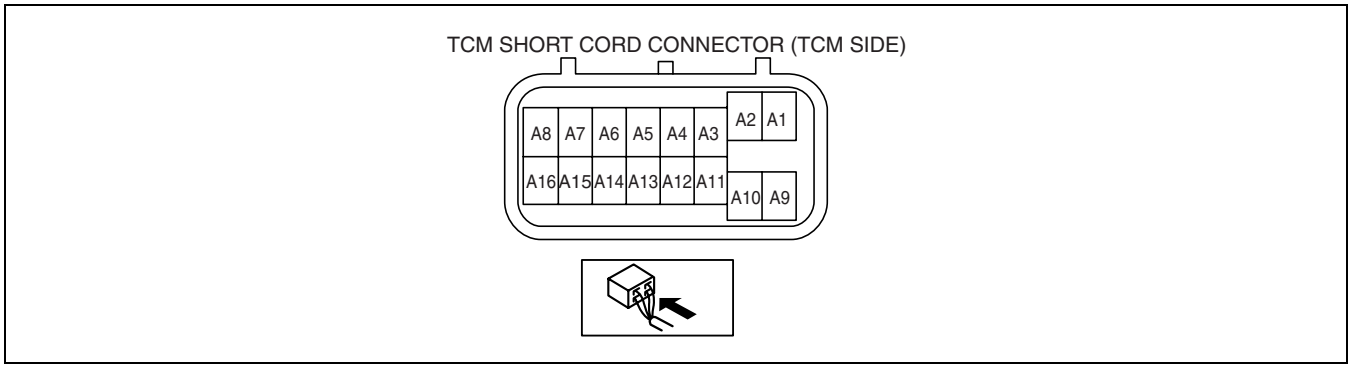
**Warning**

- **Be careful not to damage the connector waterproofing when measuring the TCM terminal voltage. If damaged, the waterproofing efficiency could be negatively affected.**

**Note**

- Use the ground of terminal A9 of the TCM connector (wiring harness-side) when measuring terminal voltage, as an error may occur when connecting the negative circuit tester to ground.

### Terminal Voltage Table (Reference)

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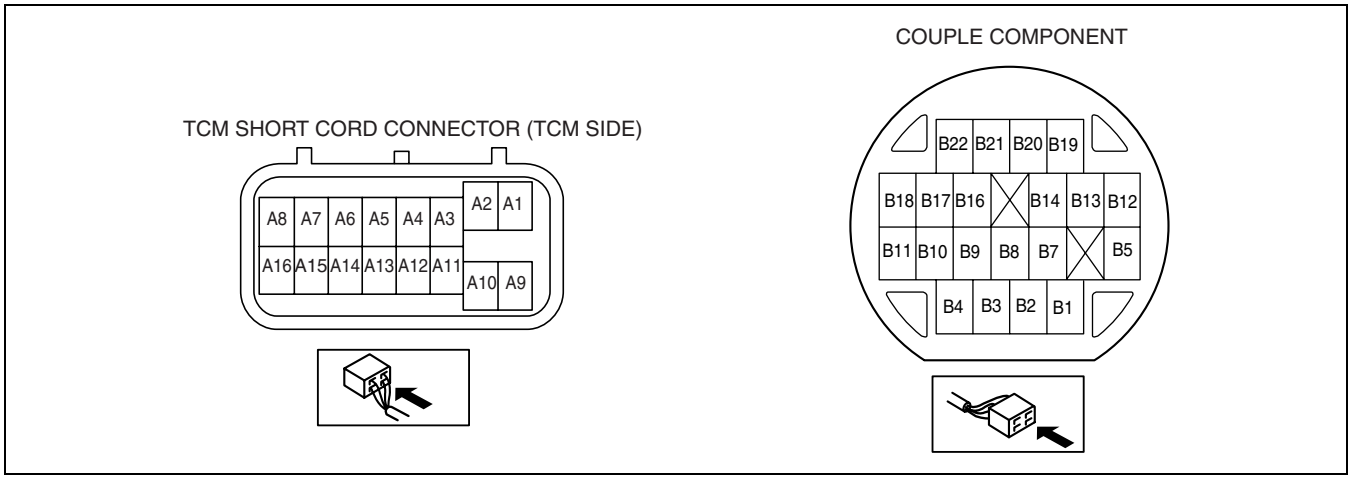
| Terminal | Signal | Connected to | Test condition | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|
| A1 | Battery back up supply | Battery | Constant | B+ | • Inspect battery<br>• Inspect related harness |
| A3 | Up switch (Selector lever component) | Up switch (Selector lever component) | Shift up (M range) | Below 1.0 | • Inspect selector lever component (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION)<br>• Inspect related harness |
| | | | Other ranges, all positions | B+ | |

| Terminal | Signal | Connected to | Test condition | | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|---|
| A4 | Down switch (Selector lever component) | Down switch (Selector lever component) | Shift down (M range) | | Below 1.0 | • Inspect selector lever component (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION)<br>• Inspect related harness |
| | | | Other ranges, all positions | | B+ | |
| A5 | Starter relay | Starter relay | Shift the selector lever to P or N position. | Ignition switch ON | B+ | • Inspect starter relay<br>• Inspect related harness |
| | | | | Ignition switch OFF | Below 1.0 | |
| A6 | CAN_L | PCM | Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible. Carry out inspection according to DTCs. | | — | • Inspect related harness |
| A7 | M range switch | M range switch | M range | | Below 1.0 | • Inspect Selector lever component (See 05-18-6 SELECTOR LEVER COMPONENT INSPECTION)<br>• Inspect related harness |
| | | | Other positions, all ranges | | B+ | |
| A11 | Power supply | Ignition switch | Ignition switch ON | | B+ | • Inspect Ignition switch<br>• Inspect related harness |
| | | | Ignition switch OFF | | Below 1.0 | |
| A13 | Back-up light relay | Back-up light relay | Ignition switch ON | Shift the selector lever to R position. | Below 1.0 | • Inspect back-up light relay (See 09-21-4 RELAY INSPECTION)<br>• Inspect related harness |
| | | | | Other | B+ | |
| A14 | CAN_H | PCM | Because this terminal is for serial communication, good/no good judgment by terminal voltage is not possible. Carry out inspection according to DTCs. | | — | • Inspect related harness |

3. Remove the TCM. (See05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
4. Verify that continuity or resistance at terminal is as indicated in the terminal continuity/resistance table.
   - If there is any malfunction, inspect the parts under “Inspection item (s)”.
     — If the system does not work properly even though the parts or related wiring harnesses do not have any malfunction, replace the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

**Terminal Continuity/Resistance Table (Reference)**

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| Terminal | Signal | Connected to | Test Condition | | Continuity/ Resistance | Inspection item (s) |
|---|---|---|---|---|---|---|
| A9 | System GND | GND | Constant | | Continuity | • Inspect related harness |
| B1 | Line pressure control solenoid control GND | Line pressure control solenoid | • Inspect resistance between couple component terminals B3 and B1 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect line pressure control solenoid (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B2 | Shift solenoid B control | Shift solenoid B | ATF temperature: 20°C {68°F} | | 11— 15 (ohms) | • Inspect shift solenoid B (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B3 | Line pressure control solenoid control | Line pressure control solenoid | • Inspect resistance between couple component terminals B3 and B1 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect line pressure control solenoid (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B4 | TCC control solenoid control GND | TCC control solenoid | • Inspect resistance between couple component terminals B9 and B4 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect TCC control solenoid (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B5 | Shift solenoid A control | Shift solenoid A | ATF temperature: 20°C {68°F} | | 11— 15 (ohms) | • Inspect shift solenoid A (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B7 | TFT sensor GND | TFT sensor | • Inspect resistance between couple component terminals B7 and B8 (wiring harness-side). | ATF temperature: 10°C {50°F} | 5.62— 7.31 (kilohms) | • Inspect TFT sensor (See 05-17-12 TRANSAXLE FLUID TEMPERATURE (TFT) SENSOR INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| | | | | ATF temperature: 25°C {77°F} | Approx. 3.5 (kilohms) | |
| B8 | TFT sensor | | | ATF temperature: 110°C {230°F} | 0.22— 0.27 (kilohms) | |

| Terminal | Signal | Connected to | Test Condition | | Continuity/ Resistance | Inspection item (s) |
|---|---|---|---|---|---|---|
| B9 | TCC control solenoid control | TCC control solenoid | • Inspect resistance between couple component terminals B9 and B4 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect TCC control solenoid (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B10 | Shift solenoid C control GND | Shift solenoid C | • Inspect resistance between couple component terminals B11 and B10 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect shift solenoid C (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B11 | Shift solenoid C control | | | | | |
| B12 | Input/turbine speed sensor (–) | Input/turbine speed sensor | • Inspect for continuity between couple component terminals B12 and B13 (wiring harness-side). | | Continuity | • Inspect input/turbine speed sensor (See 05-17-15 INPUT/ TURBINE SPEED SENSOR INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B13 | Input/turbine speed sensor (+) | | | | | |
| B14 | Shift solenoid E control | Shift solenoid E | • Inspect resistance between couple component terminals B14and B22 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect shift solenoid E (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B16 | Shift solenoid F control GND | Shift solenoid F | • Inspect resistance between couple component terminals B21and B16 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect shift solenoid F (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B17 | Shift solenoid D control | Shift solenoid D | • Inspect resistance between couple component terminals B17and B18 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect shift solenoid D (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B18 | Shift solenoid D control GND | | | | | |
| B19 | Vehicle speed (–) | VSS | • Inspect for continuity between couple component terminals B19 and B20 (wiring harness-side). | | Continuity | • Inspect VSS (See 05-17-18 VEHICLE SPEED SENSOR (VSS) INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |
| B20 | Vehicle speed (+) | VSS | | | | |
| B21 | Shift solenoid F control | Shift solenoid F | • Inspect resistance between couple component terminals B21and B16 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect shift solenoid F (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |

| Terminal | Signal | Connected to | Test Condition | | Continuity/ Resistance | Inspection item (s) |
|---|---|---|---|---|---|---|
| B22 | Shift solenoid E control GND | Shift solenoid E | • Inspect resistance between couple component terminals B14and B22 (wiring harness-side). | ATF temperature: 20°C {68°F} | 5.0— 5.6 (ohms) | • Inspect shift solenoid E (See 05-17-20 SOLENOID VALVE INSPECTION[AW6A-EL, AW6AX-EL]) • Inspect related harness |

**TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

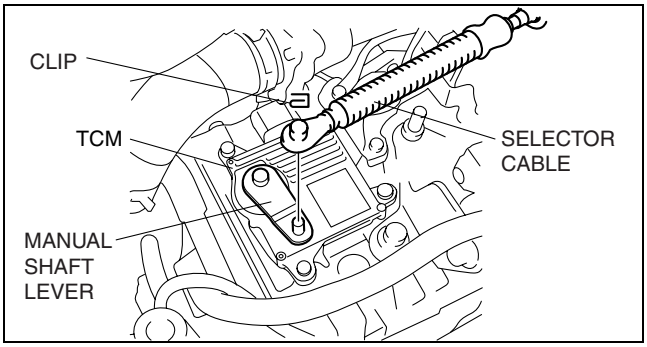
id051723800400

**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**



1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Disconnect the TCM connector.
4. Remove the clip and disconnect the selector cable.

**Caution**
- **Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, or the transaxle may be damaged.**

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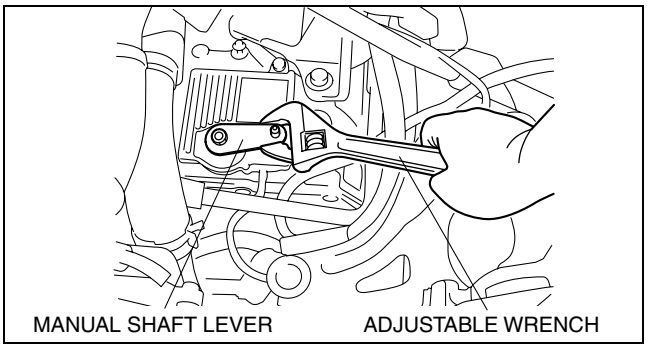
5. Set the adjustable wrench as shown in the figure to hold the manual shaft lever.

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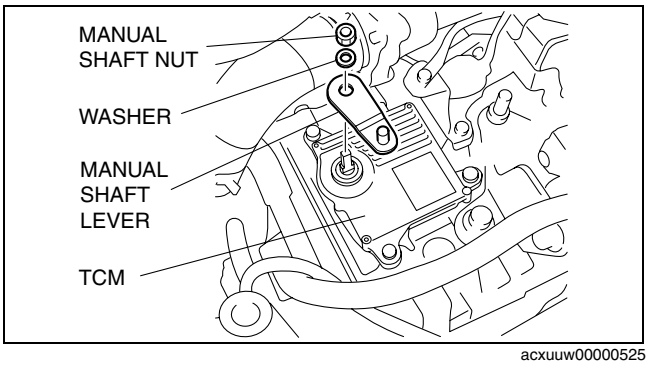
6. Remove the manual shaft nut and washer.

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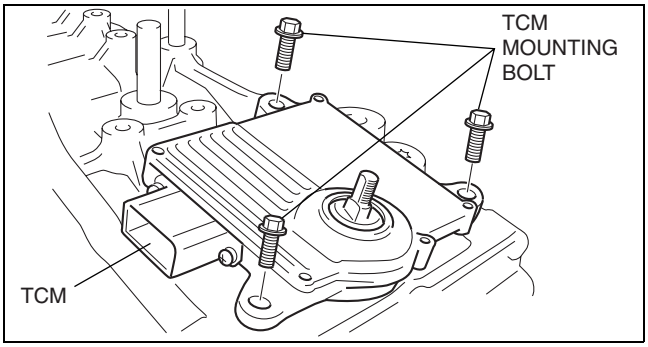
7. Remove the TCM.

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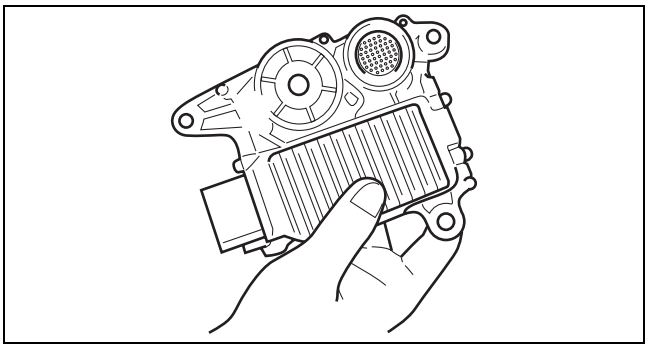
**Caution**
- **Do not touch the terminals.**



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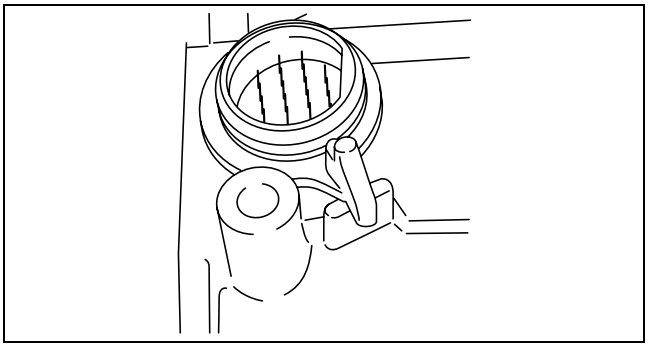
8. Inspect the condition of the connector pin of the coupler component (foreign material, bent pins, broken pins) and O-ring after the TCM is removed.



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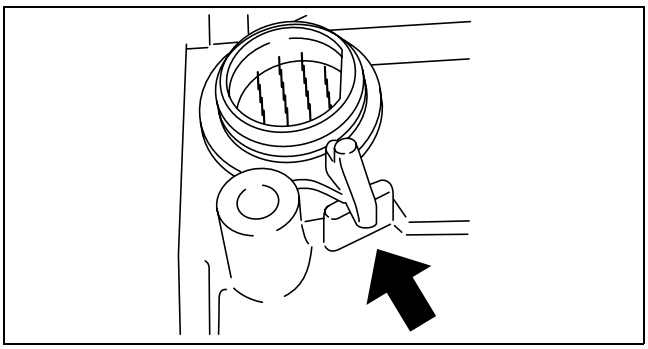
9. Align the transaxle case and coupler component connector.



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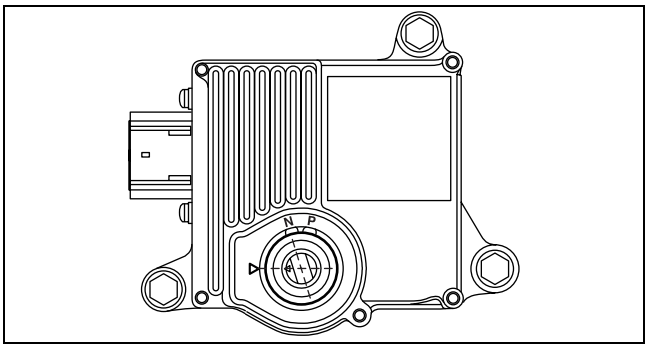
10. Be sure to match the position of the TCM marking.

**Caution**
- **Do not turn more than 60° from the marking.**

11. Install the TCM.



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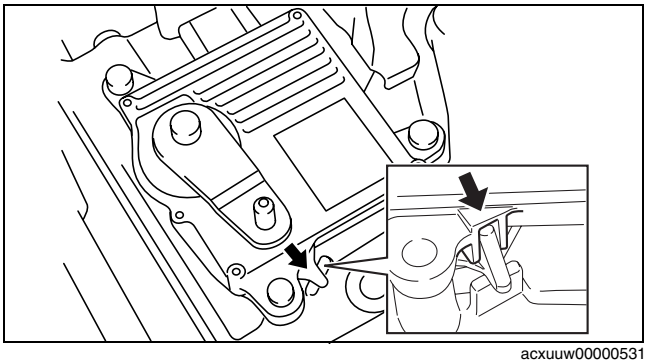
12. Verify the correct positioning of the TCM and coupler component.
13. Tighten the TCM mounting bolts.

**Tightening torque**
**19.6— 29.4 N·m {2.0— 2.9 kgf·m, 14.5— 21.6 ft·lbf}**

**Caution**
- **Do not use an impact wrench. Hold the manual shaft lever when removing the manual shaft nut, or the transaxle may be damaged.**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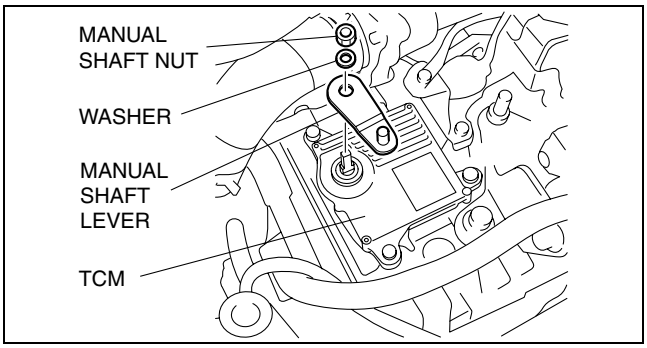
14. Install the manual shaft lever and the washer.



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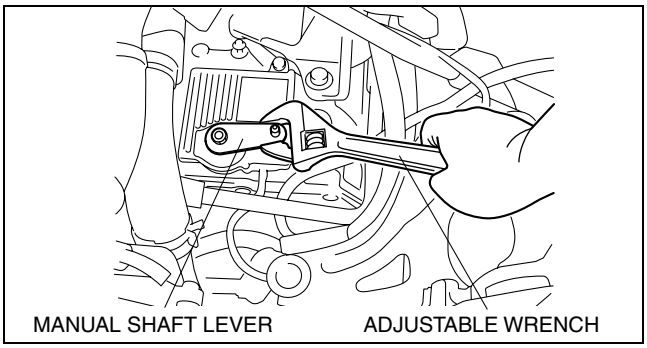
15. Set the adjustable wrench as shown in the figure to hold the manual shaft lever, and tighten the manual shaft nut.

**Tightening torque**
**9.8— 14.7 N·m {100— 142 kgf·cm, 87— 123 in·lbf}**



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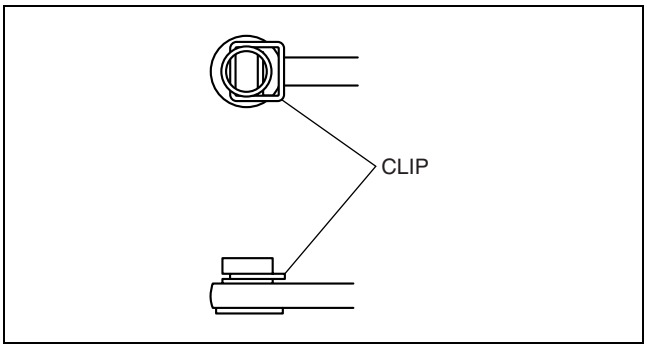
16. Install the clip to the selector cable as shown in the figure.
17. Shift the selector lever to P position.
18. Turn the manual shaft lever to P position.



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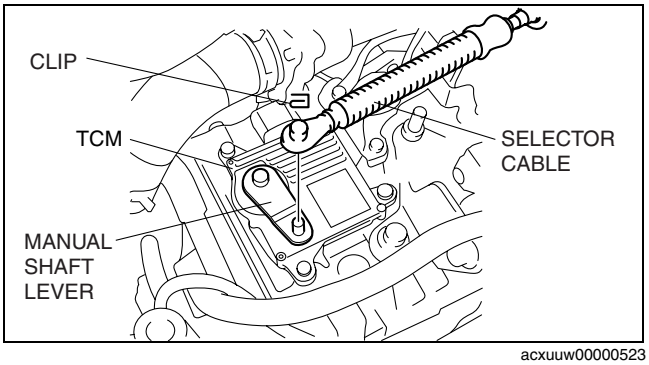
19. Connect the selector cable and install the clip.
20. Connect the TCM connector.
21. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
22. Connect the negative battery cable.

**Warning**
- **If you replace the ATX or TCM, be sure to initialize the learned values and perform neutral position learning.**

23. Perform the neutral position learning. (See 05-17-28 Neutral Position Learning.)



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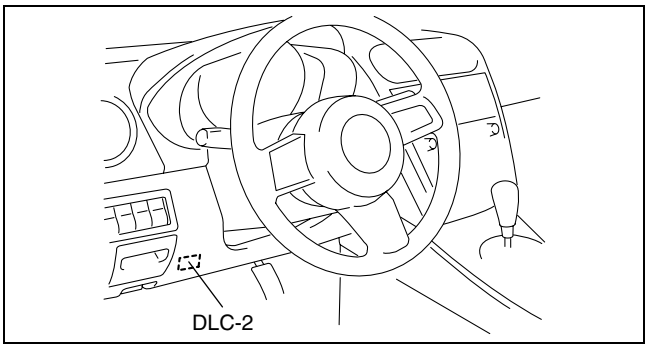
**Neutral Position Learning**

1. Engage the parking brake and use wheel chocks at the front and rear of the wheels.
2. Connect the M-MDS to the DLC-2.
3. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the "Power train".
     2. Select "Transmission".
   - When using the PDS (pocket PC)
     1. Select "All Tests and Calibrations".
4. Then, select the “Transmission Learning”.
5. Perform the N range learning according to the directions on the screen.
   - When “Operation Successful” is displayed, shift the selector lever to the P position and turn the ignition switch to the LOCK position, then to the ON position **after 5 s**.
   - If “Reinstall TCM properly and then try again” is displayed, perform the following inspection:
     — Verify that the transaxle manual shaft is in the N position.
       - If the manual shaft is in a position other than N, shaft it to the N position.
     — Verify that the selector cable is adjusted properly.
       - If the selector cable is not adjusted properly, adjust it. (See 05-18-7 SELECTOR CABLE ADJUSTMENT.)
     — Inspect the manual shaft lever for deformation.
       - If there is any malfunction, replace the manual shaft lever.
6. Shift the selector lever from P position to D range, then verify that the positions of the selector lever and the indicator are aligned.
   - If there is any malfunction, inspect the DTC. (See 05-02-5 DTC TABLE[AW6A-EL, AW6AX-EL].)

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**OIL SEAL (MANUAL SHAFT) REPLACEMENT[AW6A-EL, AW6AX-EL]**

id051723802300

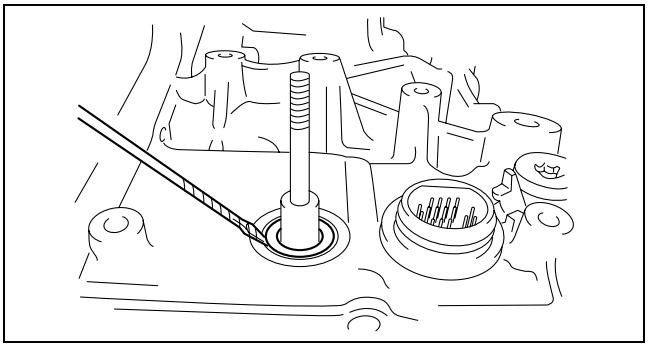
**Caution**
- **Water or foreign material entering the connector can cause a poor connection or corrosion. Be sure not to allow water or foreign material on the connector when disconnecting.**

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

**Caution**
- **Do not damage the transaxle case.**
- **Do not damage the manual shaft.**

4. Remove and discard the oil seal using a tape-wrapped flathead screwdriver.

**Caution**
- **Do not damage the oil seal.**



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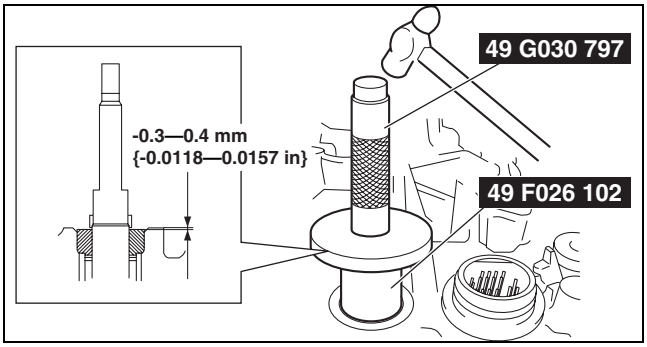
5. Using the **SST** and a hammer, tap a new oil seal so that the specified oil seal position is obtained.
   **Substitution SST**
   - **49 F026 102**
     Outer diameter: 27 mm {1.06 in} or more
     Inner diameter: 15— 18 mm {0.60— 0.70 in}
6. Install the TCM. (See 05-17-25 TCM REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
8. Connect the negative battery cable.



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**AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

id051723802400

1. Disconnect the negative battery cable.
2. Remove the following parts.
   (1) Battery and battery tray (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC].)
   (2) Air cleaner component (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   (3) Engine cover
   (4) Charge air cooler (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC])
   (5) Windshield wiper arm and blade (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (6) Cowl grille (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
   (7) Front wheel
   (8) Splash shield
   (9) Under cover
   (10)Side cover
   (11)Propeller shaft (transfer side) (See 03-15-3 PROPELLER SHAFT REMOVAL/INSTALLATION.)
   (12)Transfer oil cooler (See 03-16-3 TRANSFER OIL COOLER REMOVAL/INSTALLATION.)
3. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)

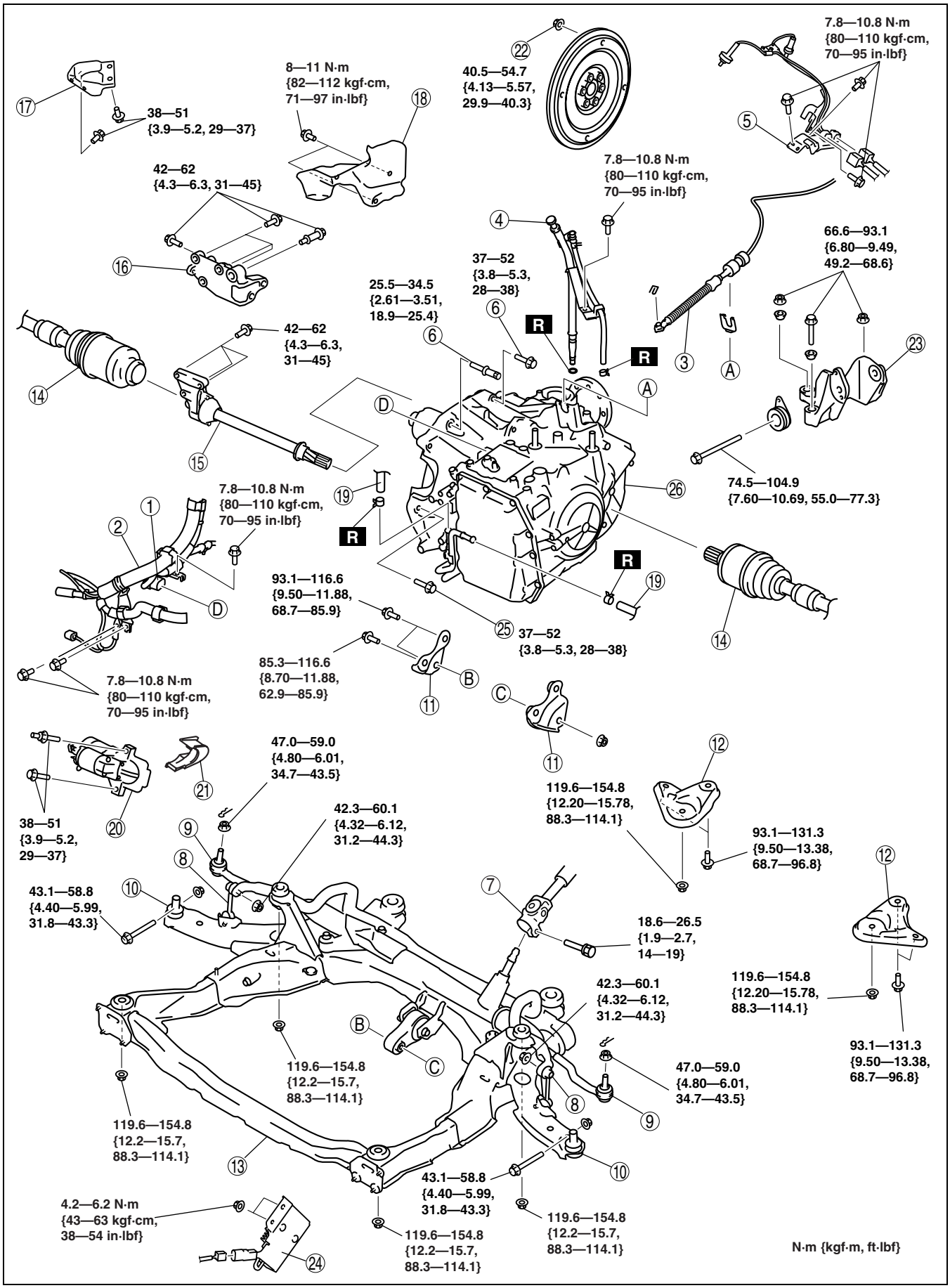
**Warning**
- **Improperly jacking a transaxle is dangerous. It can slip off the jack and may cause serious injury.**

**Caution**
- **To prevent the torque converter and transaxle from separating, remove the transaxle without tilting it toward the torque converter.**

4. Remove in the order shown in the figure.
5. Install in the reverse order of removal.
6. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
7. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

| Service item | Test item | | | |
|---|---|---|---|---|
| | Line pressure test | Stall test | Time lag test | Time lag test |
| ATX replacement | X | | | |
| ATX overhaul | X | X | X | X |
| Torque converter replacement | X | X | | |
| Oil pump replacement | X | | | |
| Control valve body component | X | | | |
| Clutch system replacement | X | | X | X |

X : Test to be performed after the service work

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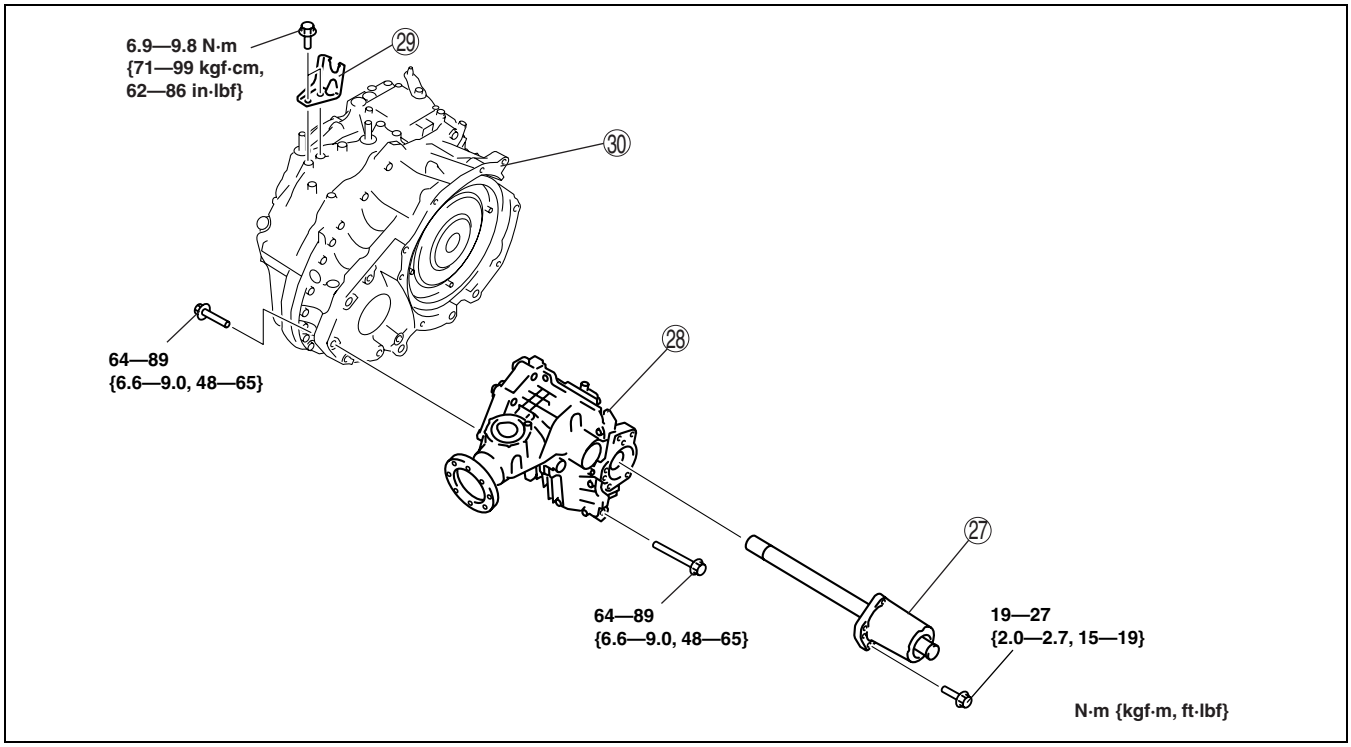
| | |
|---|---|
| 1 | TCM connector |
| 2 | Wiring harness bracket |
| 3 | Selector cable<br>(See05-17-35 Selector Cable Installation Note.) |
| 4 | Oil filter tube, Dipstick, breather hose |
| 5 | Wiring harness bracket (HO2S) |
| 6 | Transaxle mounting bolt (Upper side) |
| 7 | Steering shaft<br>(See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) |
| 8 | Stabilizer control link |
| 9 | Tie-rod end ball joint<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.) |
| 10 | Lower arm ball joint<br>(See 02-13-7 FRONT LOWER ARM REMOVAL/ INSTALLATION.) |
| 11 | No.1 engine mount bracket<br>(See05-17-34 No.1 Engine Mount Installation Note.) |
| 12 | Crossmember bracket |
| 13 | Crossmember<br>(See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.) |
| 14 | Drive shaft<br>(See 03-13-12 FRONT DRIVE SHAFT REMOVAL/ INSTALLATION.) |
| 15 | Joint shaft (2WD)<br>(See 03-13-3 JOINT SHAFT REMOVAL/ INSTALLATION[2WD].) |

| | |
|---|---|
| 16 | Transfer bracket (AWD) |
| 17 | WU-TWC bracket (AWD) |
| 18 | Heat shield (AWD) |
| 19 | Oil hose<br>(See 05-17-47 OIL COOLER REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].) |
| 20 | Starter<br>(See 01-19-2 STARTER REMOVAL/ INSTALLATION[L3 WITH TC].) |
| 21 | Endplate cover |
| 22 | Torque converter installation nuts<br>(See05-17-32 Torque Converter Nuts Removal Note.)<br>(See05-17-35 Torque Converter Nuts Installation Note.) |
| 23 | No.4 engine mount bracket<br>(See05-17-32 No.4 Engine Mount Bracket Removal Note.)<br>(See05-17-34 No.4 Engine Mount Bracket Installation Note.) |
| 24 | Resistor |
| 25 | Transaxle mounting bolt (lower side) |
| 26 | Transaxle (2WD)<br>(See05-17-34 Transaxle Removal Note.)<br>(See05-17-34 Transaxle Installation Note.) |
| | Transaxle, transfer and Joint shaft (AWD)<br>(See05-17-34 Transaxle Removal Note.)<br>(See05-17-34 Transaxle Installation Note.) |



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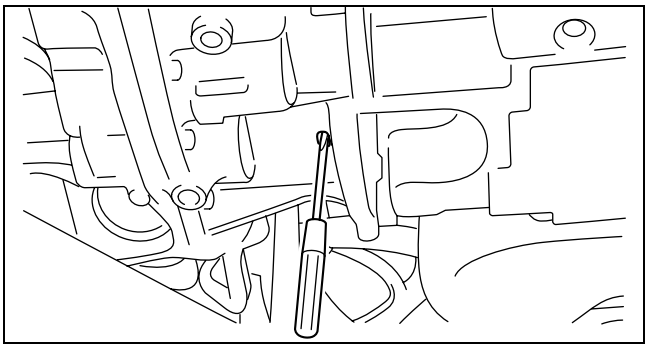
| | |
|---|---|
| 27 | Joint shaft (AWD)<br>(See 03-13-4 JOINT SHAFT REMOVAL/ INSTALLATION[AWD].) |

| | |
|---|---|
| 28 | Transfer (AWD) |
| 29 | Cable bracket |
| 30 | Transaxle |

**Torque Converter Nuts Removal Note**

1. Align the holes by turning the torque converter.
2. Insert a flathead screwdriver through the converter housing service hole, and lock the drive plate.



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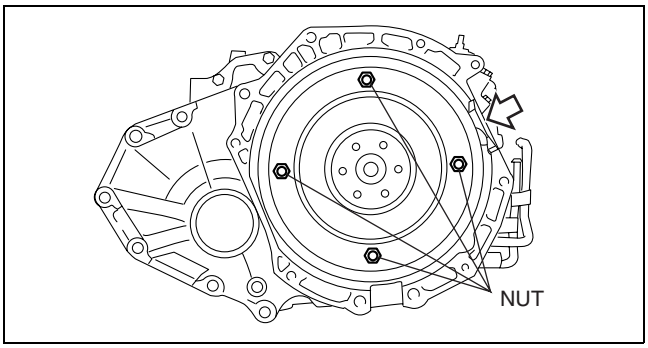
3. Remove the torque converter nuts.

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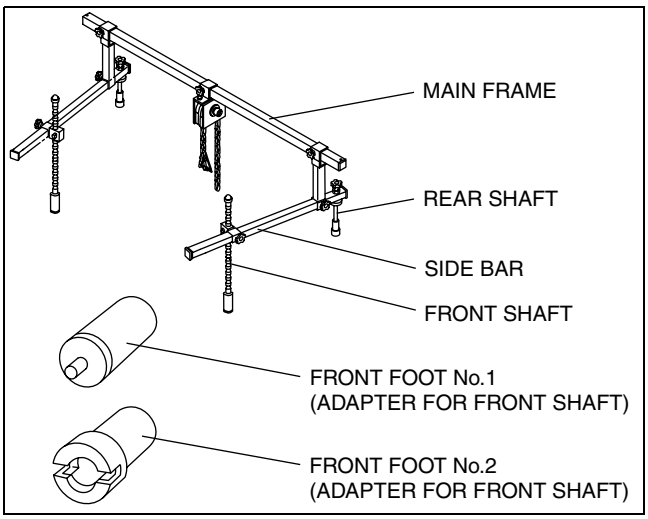
**No.4 Engine Mount Bracket Removal Note**

1. Install the SST using the following procedure.

**Caution**

- **Refer to the SST instruction manual for the basic handing procedure.**

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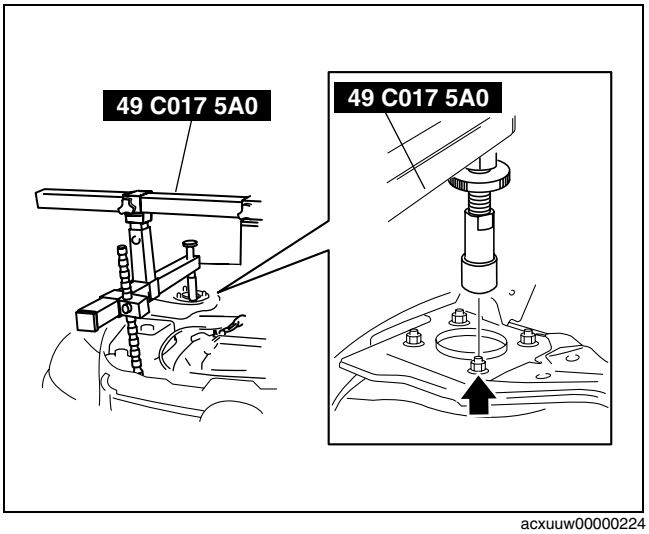
(1) Install the right rear shaft of the **SST** to the bolt of the right shock absorber as shown in the figure.
(2) Install the left rear shaft of the **SST** to the bolt of the left shock absorber. (Identical position to the right side)

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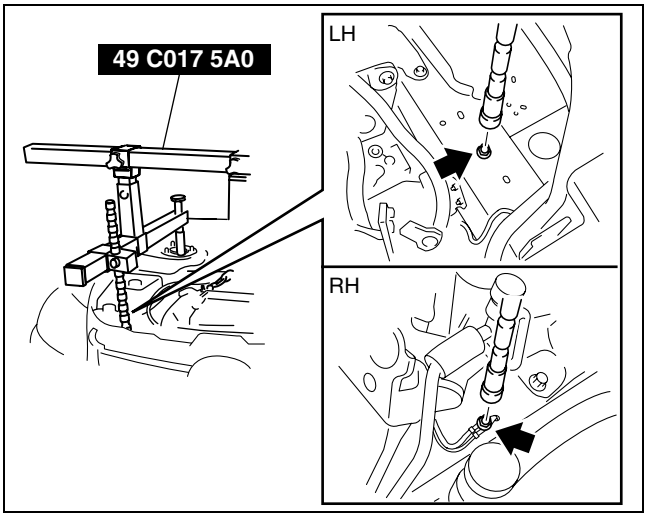
(3) Temporarily tighten the air clear bracket installation bolt, and install the left/right front shaft of the **SST** with front foot No.2 to the bolt as shown in the figure.
(4) Adjust the positions of the **SST** side bars so that they are the same height (left and right) and horizontal.
(5) Make sure each joint is securely tightened.

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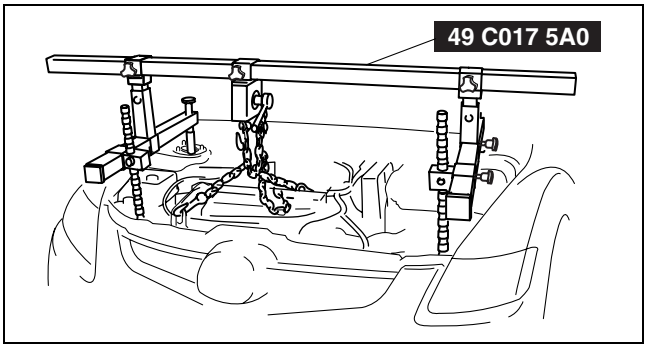
2. Support the engine using the **SST.**
3. Remove the No.4 engine mount bracket.

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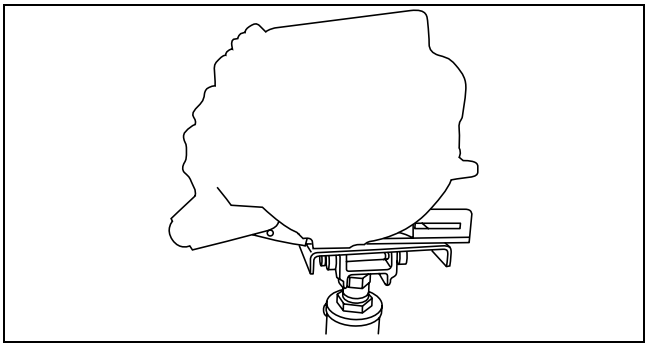
**Transaxle Removal Note**

1. Support the transaxle on a jack.
2. Remove the transaxle mounting bolts.
3. Remove the transaxle.



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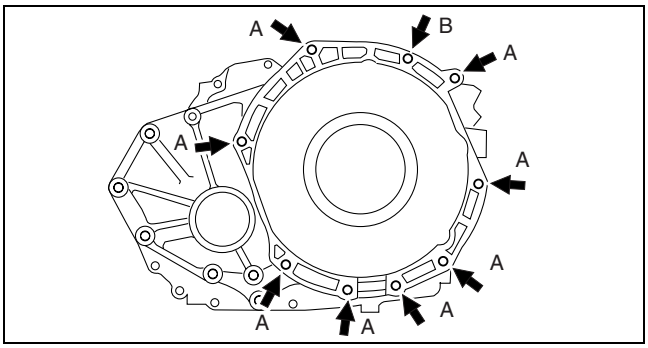
**Transaxle Installation Note**

1. Set the transaxle on a jack and lift it.
2. Install the transaxle mounting bolts.

**Tightening torque**
**A: 37— 52 N·m {3.8— 5.3 kgf·m, 28— 38 ft·lbf}**
**B: 25.5— 34.5 N·m {2.61— 3.51 kgf·m, 18.9— 25.4 ft·lbf}**

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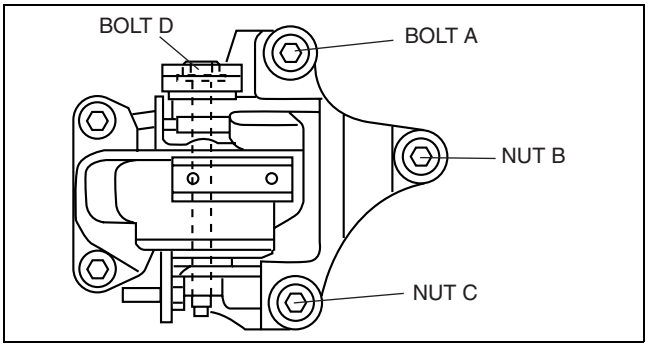
**No.4 Engine Mount Bracket Installation Note**

1. Install the No.4 engine mount bracket to the transaxle and temporarily tighten nuts
2. Temporarily tighten bolt.
3. Temporarily tighten bolt A and nuts B, C.
4. Tighten bolt A, nuts B and C in the order of B→A→C.
5. Tighten bolt D.

**Tightening torque**
**Bolt A, Nut B, C: 66.6— 93.1 N·m {6.80— 9.49 kgf·m, 49.2— 68.6 ft·lbf}**
**Bolt D: 74.5— 104.9 N·m {7.60— 10.69 kgf·m, 55.0— 77.3 ft·lbf}**

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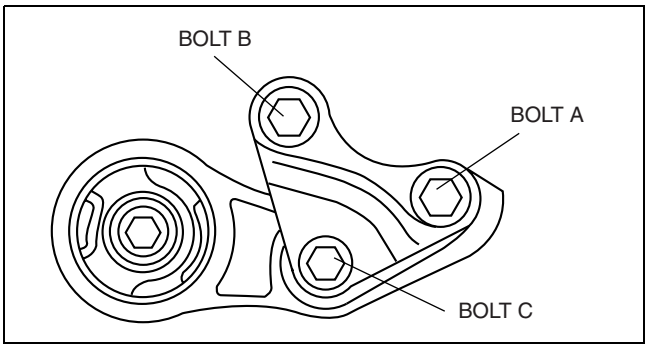
**No.1 Engine Mount Installation Note**

1. Install the No.1 engine mount bracket to the transaxle, then temporarily tighten bolts A and B.
2. Install the No.1 engine mount rubber to the bracket, then temporarily tighten bolt C.
3. Tighten bolts A and B in the order of A→B.
4. Tighten bolt C.

**Tightening torque**
**Bolt A, B: 93.1— 116.6 N·m {9.50— 11.88 kgf·m, 68.7— 85.9 ft·lbf}**
**Bolt C: 85.3— 116.6 N·m {87.0— 11.88 kgf·m, 62.9— 85.9 ft·lbf}**

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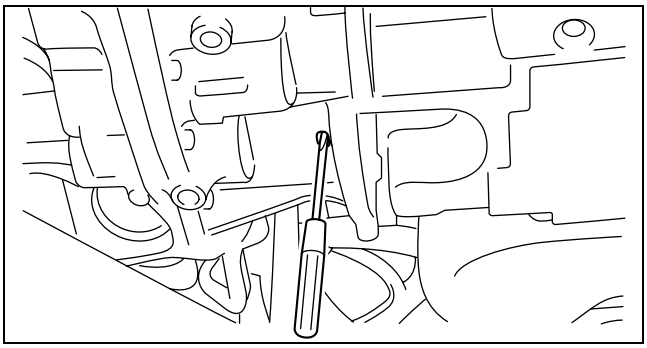
**Torque Converter Nuts Installation Note**

1. Align the holes by turning the torque converter.
2. Insert a screwdriver through the converter housing service hole, and lock the drive plate.



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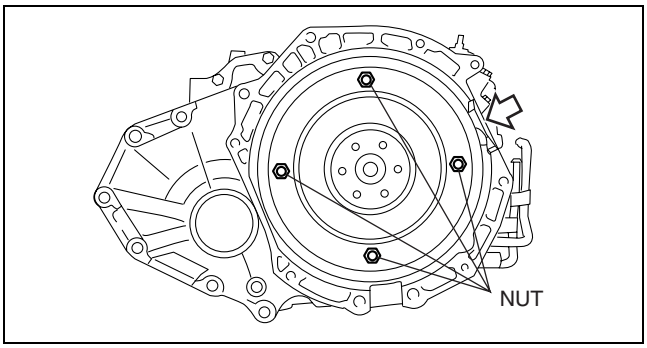
**Caution**

- **Loosely and equally tighten the torque converter nuts, then further tighten them to the specified tightening torque.**

3. Tighten the torque converter mounting nuts.

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**Tightening torque**

**34.3— 60.8 N·m {3.50— 6.19 kgf·m, 25.3— 44.8 ft·lbf}**



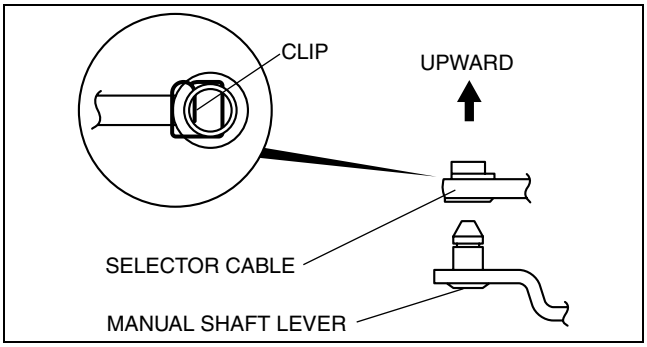
**Selector Cable Installation Note**

1. Install the selector lever to the manual shaft lever so that no load acts on the selector cable.

**Note**

- Install the selector lever to the manual shaft lever with the clip side of the selector cable end facing up.

2. Confirm that the tip of the manual shaft lever projects out of the end of the selector cable.

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**OIL SEAL (DIFFERENTIAL) REPLACEMENT[AW6A-EL, AW6AX-EL]**

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1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)

**Caution**

- **The oil seal is easily damaged by the sharp edges of the drive shaft splines. Do not let the splines contact the oil seal.**

4. Remove the drive shaft. (See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
5. Remove the joint shaft. (2WD) (See 03-13-3 JOINT SHAFT REMOVAL/INSTALLATION[2WD].)
6. Remove the transfer and joint shaft. (AWD) (See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD].) (See 03-16-3 TRANSFER REMOVAL/INSTALLATION.)

**Caution**

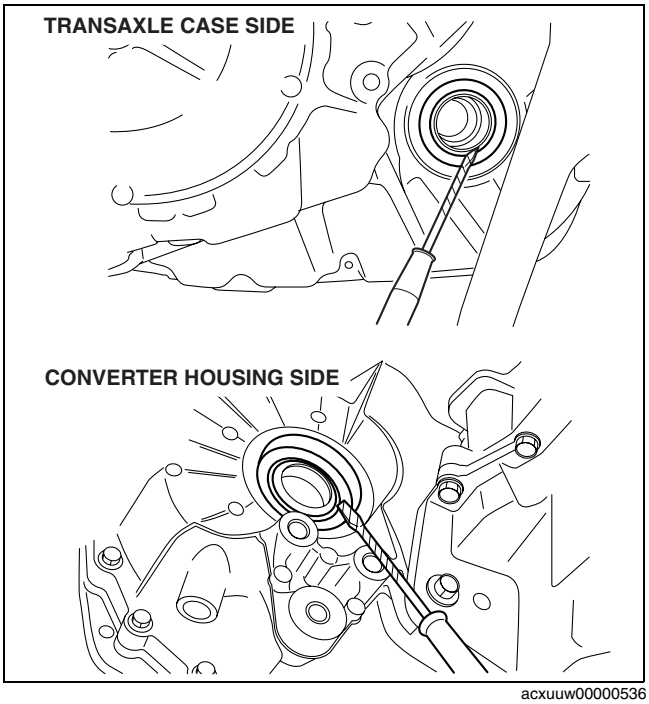
- **Do not damage the transaxle case.**
- **Do not damage the differential case.**

7. Remove the oil seal lip using a razor.

8. Remove and discard the oil seal using a tape-wrapped flathead screwdriver.

**Caution**
- **Do not damage the oil seal.**

9. Using the **SST** and a hammer, tap a new oil seal so that the specified oil seal position is obtained.

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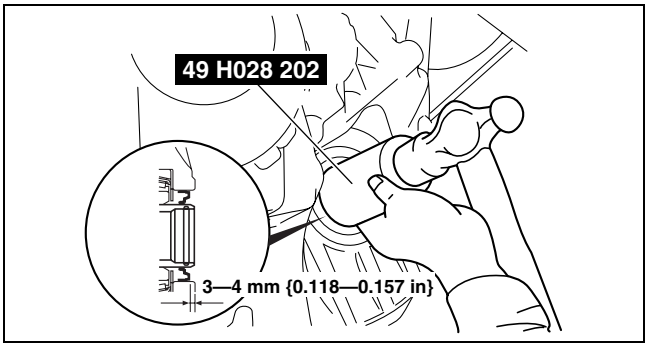
**Transaxle case side**

**Substitution SST**
- **49 H028 202**
  Outer diameter: 54.5— 61 mm {2.15— 2.40 in}
  Inner diameter: 52 mm {2.05 in} or more
  Plate thickness: 2 mm {0.08 in} or more

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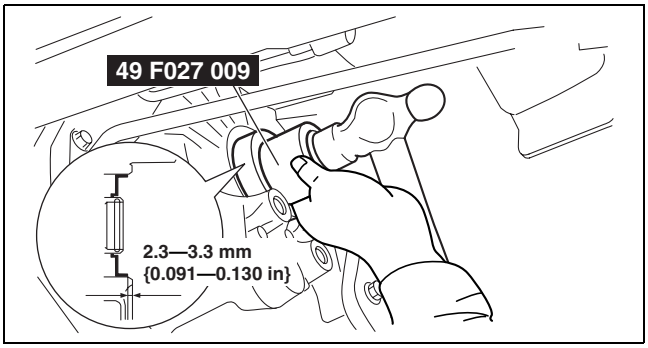
**Converter housing side (2WD)**

**Substitution SST**
- **49 F027 009**
  Outer diameter: 76.8 mm {3.02 in}
  Plate thickness: 2 mm {0.08 in} or more

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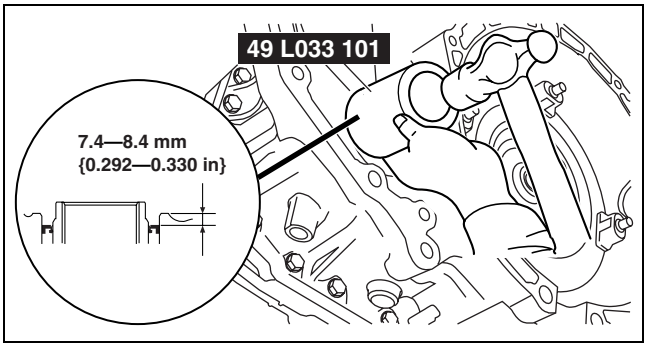
**Converter housing side (AWD)**

**Substitution SST**

- **49 L033 101**
  Outer diameter: 73— 76.3 mm {2.88— 3.00 in}
  Inner diameter: 69 mm {2.72 in} or more
  Plate thickness: 2 mm {0.08 in} or more
  Length: 20 mm {0.79 in} or more



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10. Install the joint shaft. (2WD) (See 03-13-3 JOINT SHAFT REMOVAL/INSTALLATION[2WD].)
11. Install the transfer and joint shaft. (AWD) (See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD].) (See 03-16-3 TRANSFER REMOVAL/INSTALLATION.)
12. Install the drive shaft. (See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)
13. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
14. Connect the negative cable.
15. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)



**DIFFERENTIAL GEAR O-RING REPLACEMENT[AW6A-EL, AW6AX-EL]**

id051723800200

**Caution**

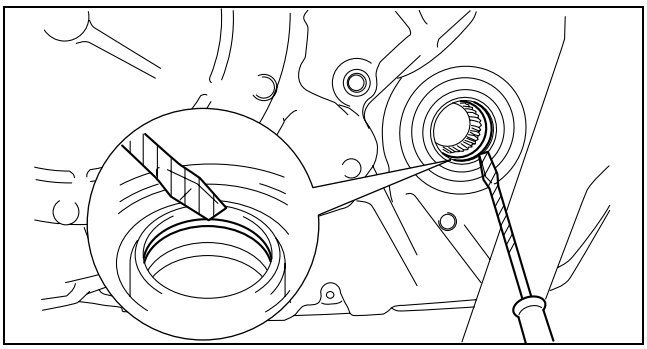
- **The O-ring is easily damaged by the sharp edges of the drive shaft splines. Do not let the splines contact the O-ring.**

1. Remove the drive shaft and joint shaft. (See 03-13-3 JOINT SHAFT REMOVAL/INSTALLATION[2WD].) (See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD].) (See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)

**Caution**

- **Do not damage the differential case.**

2. Remove and discard the O-ring using a tape-wrapped flathead screwdriver.


acxuuw00000543

**Caution**

- **Do not damage the O-ring.**
- **Do not damage the differential case.**

3. Apply ATF to a new O-ring and install it to the differential case.
4. Install the drive shaft and joint shaft. (See 03-13-3 JOINT SHAFT REMOVAL/INSTALLATION[2WD].) (See 03-13-4 JOINT SHAFT REMOVAL/INSTALLATION[AWD].) (See 03-13-12 FRONT DRIVE SHAFT REMOVAL/INSTALLATION.)

## CONTROL VALVE BODY REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]

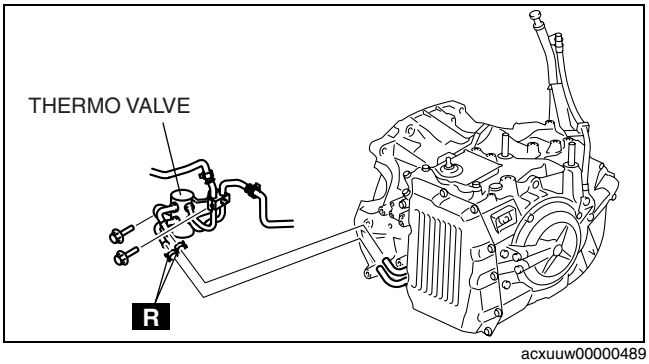
id051723801800

### On-Vehicle Removal

**Warning**
- **Using compressed air can cause dirt and other particles to fly out, causing injury to the eyes. Wear protective eyeglasses whenever using compressed air.**

**Caution**
- **Clean the transaxle exterior throughout with a steam cleaner or cleaning solvents before removal.**
- **If any old sealant gets into the transaxle during installation of the control valve body cover, trouble may occur in the transaxle case and control valve body cover. Clean with cleaning fluid.**

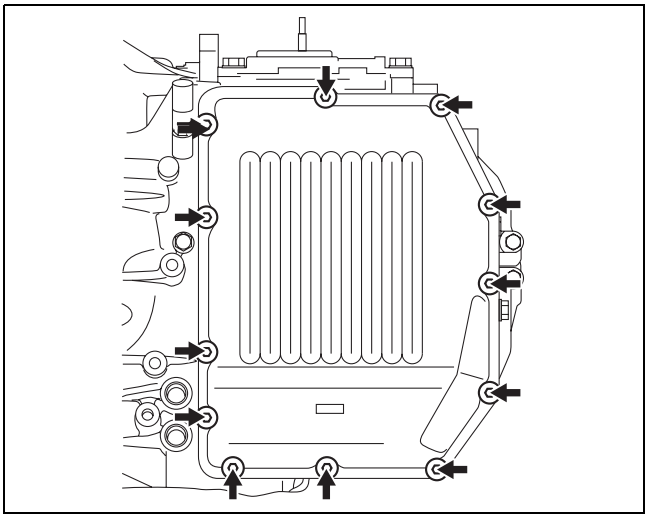
1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Drain the ATF. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
5. Remove the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
6. Remove the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)




acxuuw00000489

7. Remove the control valve body cover installation bolt.

**Caution**
- **Do not damage the fitting surface of the transaxle case and the control valve body cover.**
- **Do not deform the control valve body cover.**



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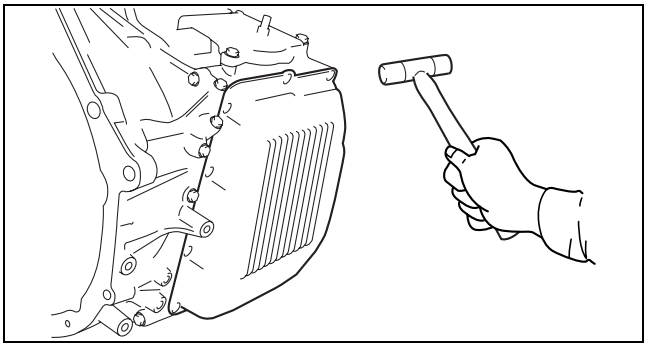
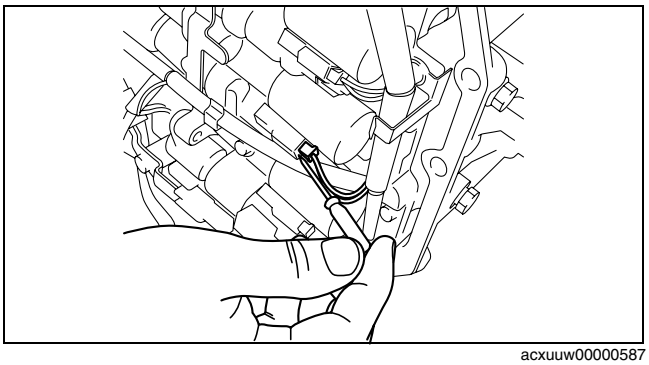
8. Using a plastic hammer, tap the control valve body cover to remove it.

**Caution**
- **Be careful not to damage the solenoid valves and connectors.**
- **Do not pull the wiring harnesses when removing the connector.**


acxuuw00000586

**Note**
- Disconnect the solenoid connector according to the following procedure:

1. Insert a precision screwdriver from the backside into the connector as shown in the figure.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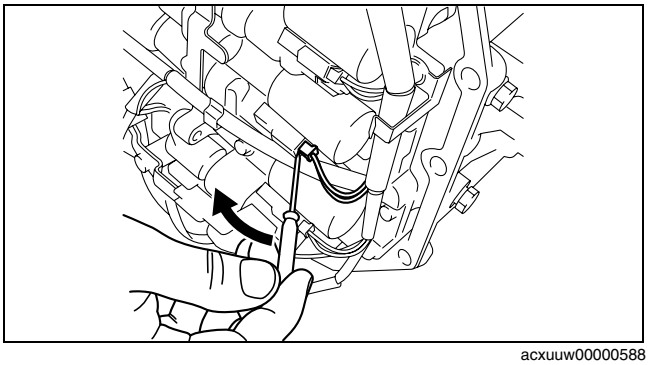
2. Pry the screwdriver in the direction of the arrow and disconnect the connector.

**Caution**
- **Do not damage the solenoid valves and connectors with the screwdriver.**
- **When disconnecting connectors, grasp the connectors, not the harnesses. Otherwise, the harnesses may be pulled out of the connector causing poor contact.**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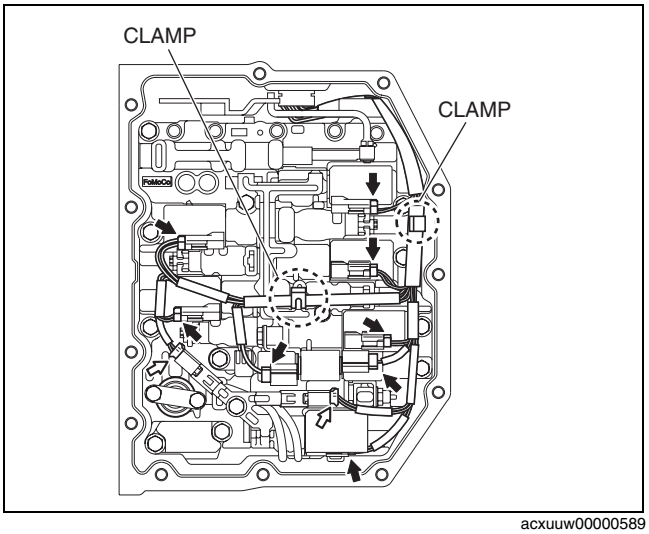
9. Disconnect the solenoid connectors, VSS connector and the input/turbine speed sensor connector.
10. Disconnect the coupler component from the clamp.



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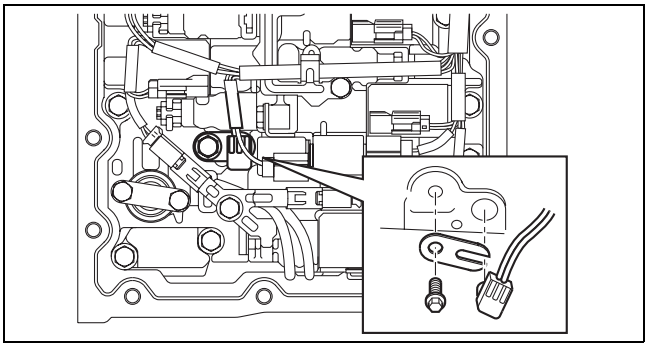
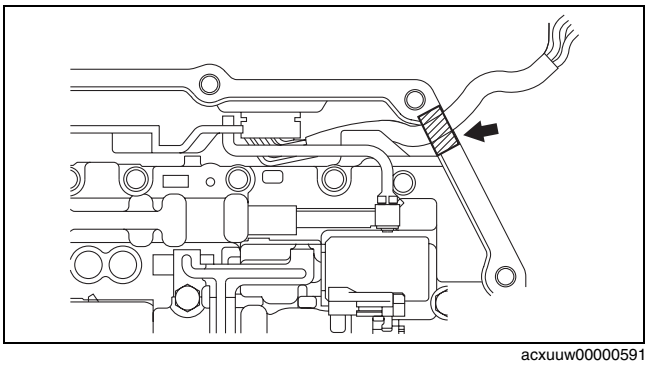
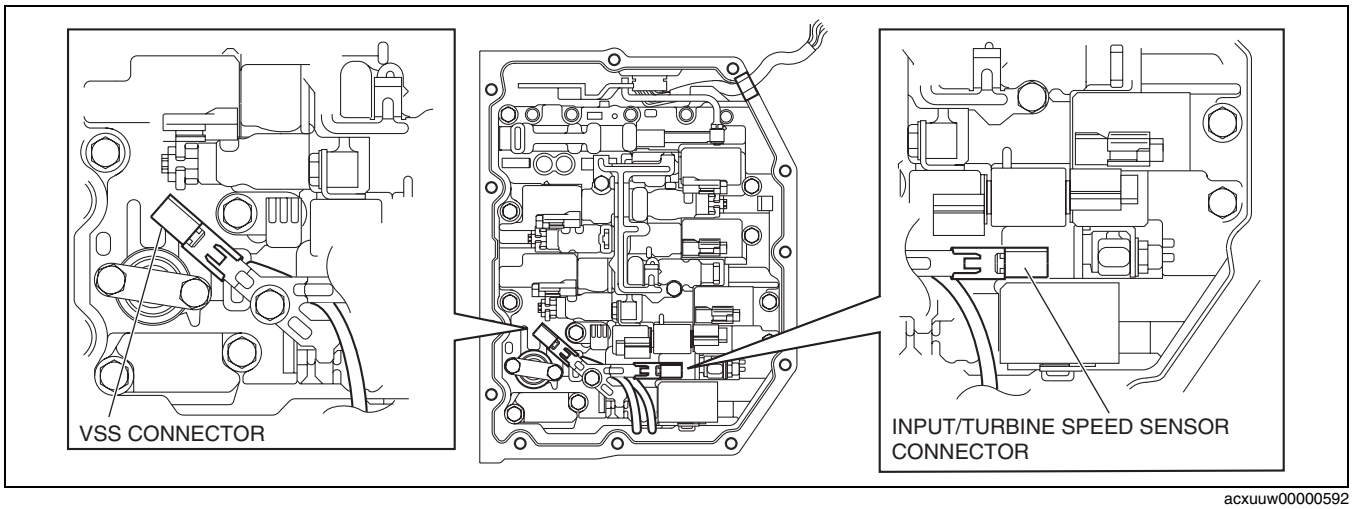
11. Remove the lock plate, and pull out the TFT sensor from the control valve body.
12. Remove the O-ring from the TFT sensor.

**Note**
- Be sure to secure the coupler component with tape so that it will not interfere with the control valve body component.


acxuuw00000590

13. Fix the coupler component with tape to the transaxle case as shown in the figure.
14. Remove the VSS connector and input/turbine speed sensor connector from the solenoid clamp.


acxuuw00000591



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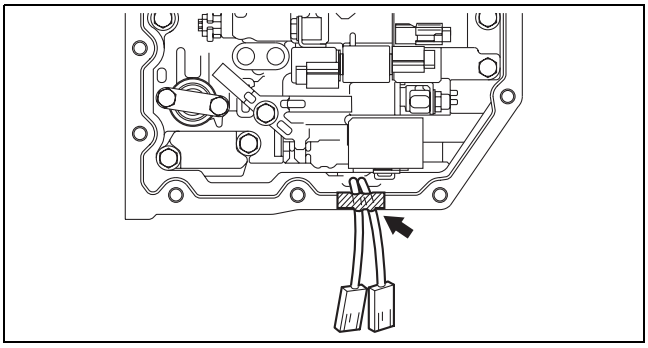
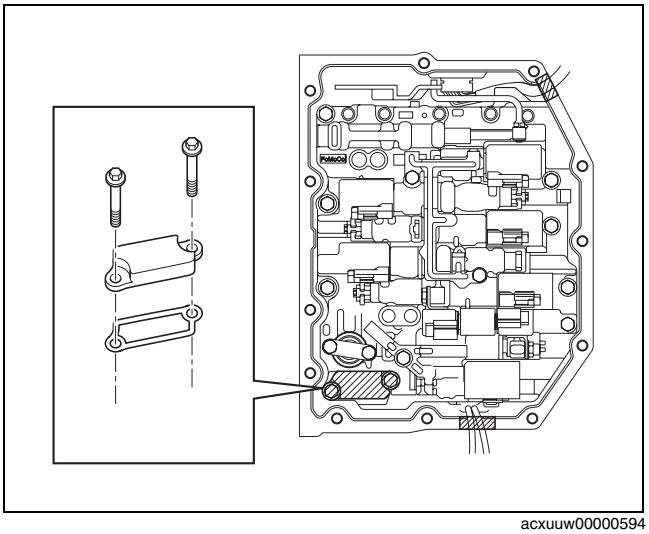
**Note**
- Be sure to secure the VSS and input/turbine speed sensor with tape so that they will not interfere with the control valve body component.

15. Fix the VSS wiring harness and input/turbine speed sensor wiring harness with tape to the transaxle case as shown in the figure.


acxuuw00000593

16. Remove the suction cover and the gasket.

**Caution**
- **Evenly loosen the bolts a little at a time in the order shown in the figure.**

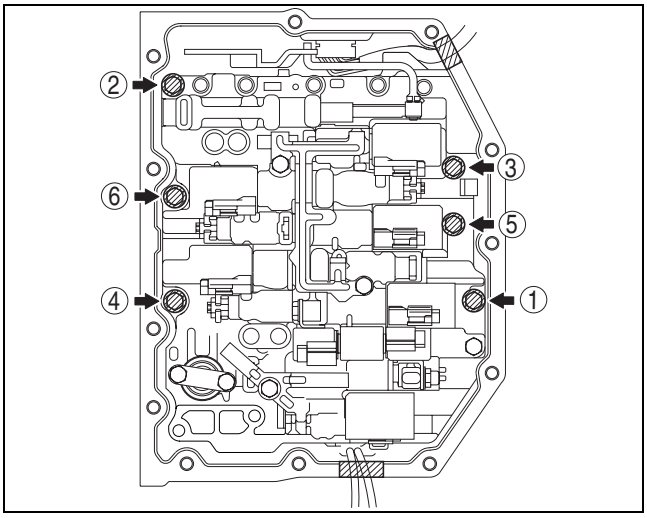


acxuuw00000594



17. Remove the control valve body installation bolts.

**Caution**
- **Do not drop the control valve body component.**

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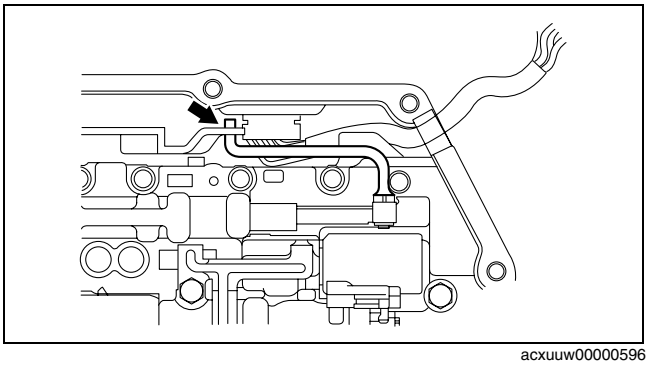
18. Disconnect the manual valve link and remove the control valve body component.



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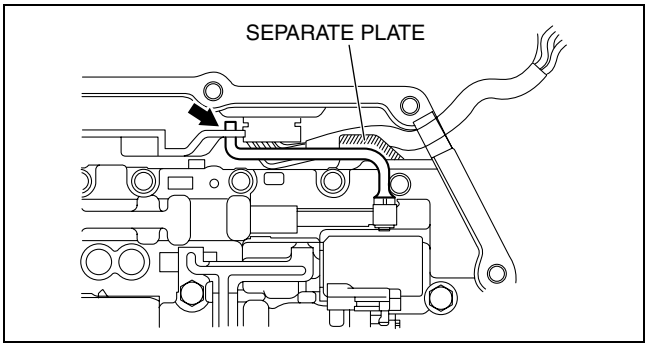
**On-Vehicle Installation**

**Caution**
- **When installing the control valve body component, do not put the coupler component in the open space of the separate plate in the control valve body component.**
- **Do not pinch the coupler component between the separate plate and the control valve body component.**

1. Connect the manual valve link and install the control valve body component.

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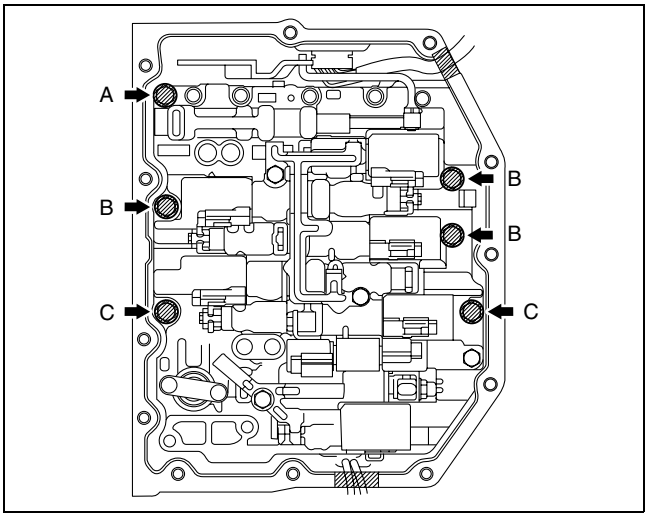
2. Temporarily install the control valve body component with the bolts.

**Bolt length (measured from below the head)**
**A: 31 mm {1.220 in}**
**B: 17 mm {0.669 in}**
**C: 21 mm {0.827 in}**

**Note**
- Aligning the bolt holes, temporarily tighten the bolt by hand.

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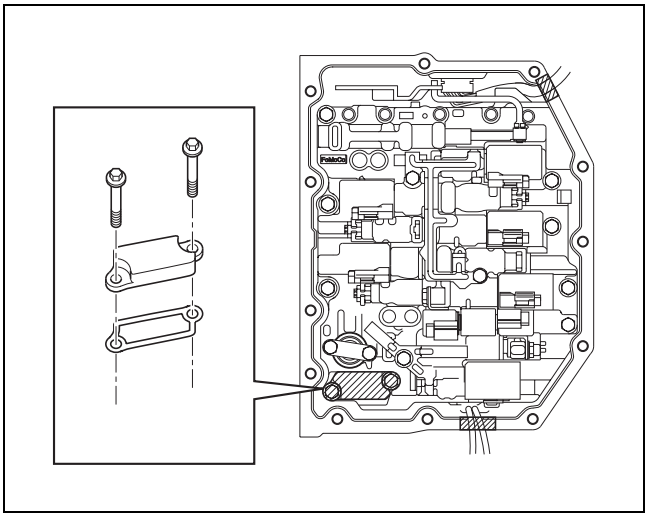
3. Temporarily install the suction cover and a new gasket with the bolts.



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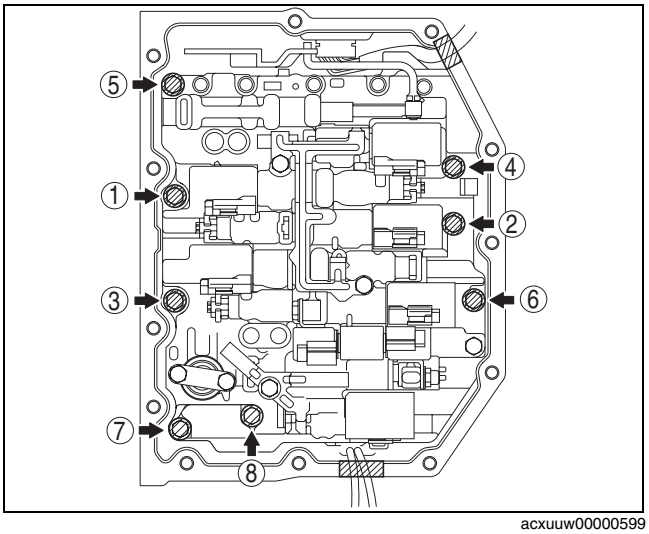
4. Tighten the bolts in the order shown in the figure.

   **Tightening torque**
   **8— 12 N·m {82— 122 kgf·cm, 72— 105 in·lbf}**

5. Install the connector of the VSS and input/turbine speed sensor to the solenoid clamp.

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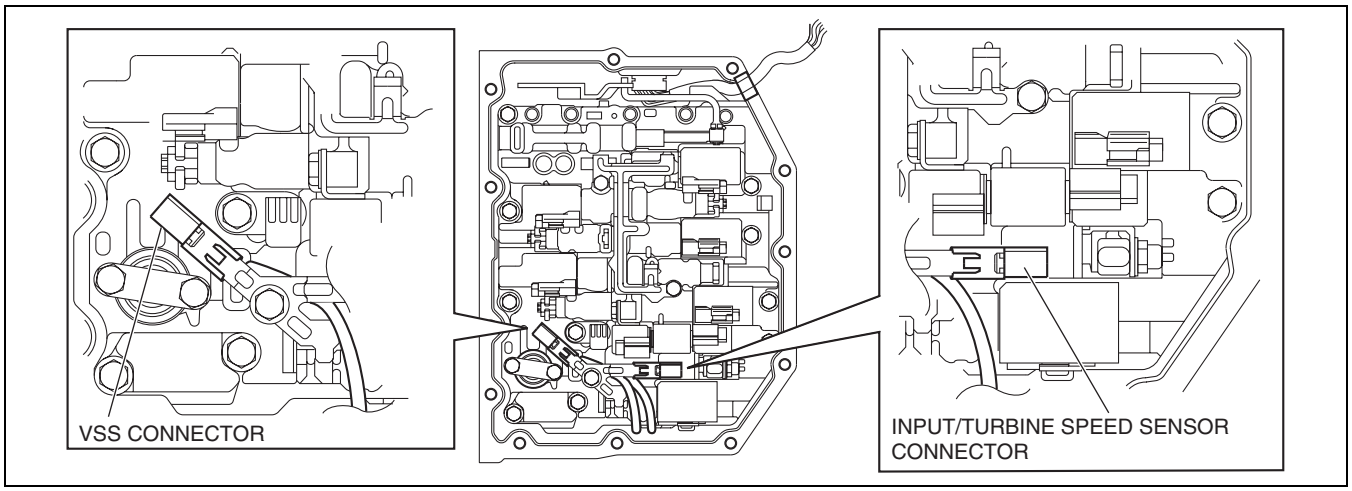
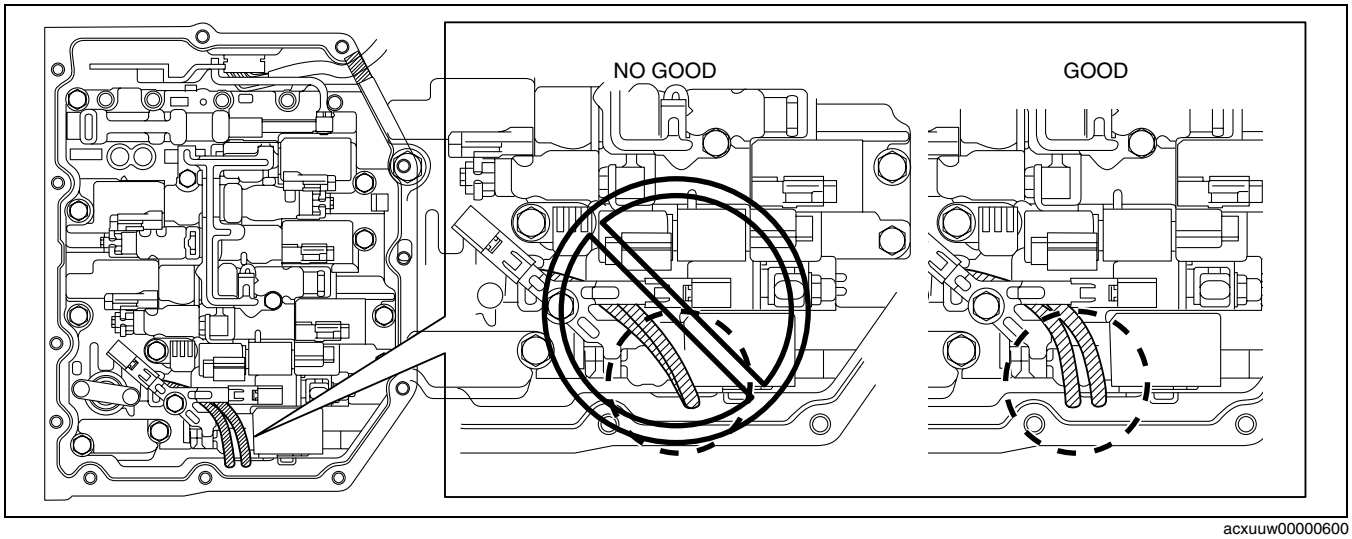



acxuuw00000592

**Caution**

- **If the control valve body cover is installed with the wiring harnesses overlapped, the wiring harnesses may be pinched between the cover and valve body causing the wiring harnesses to be damaged. Therefore, verify that the wiring harnesses are not overlapped when installing the control valve body cover.**

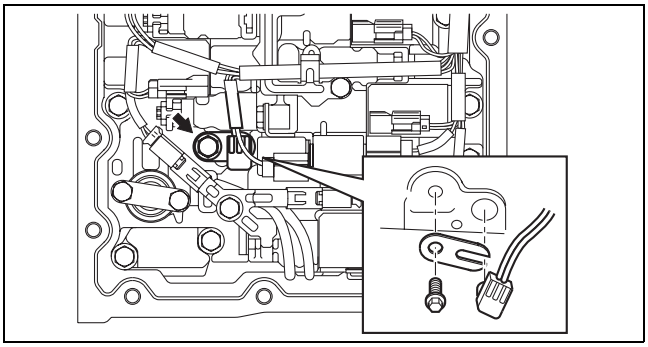



acxuuw00000600

6. Apply ATF to a new O-ring and install it on the TFT sensor.

7. Install the TFT sensor with the lock plate and a bolt to the control valve body component as shown in the figure.

   **Tightening torque**
   **8— 12 N·m {82— 122 kgf·cm, 72— 105 in·lbf}**



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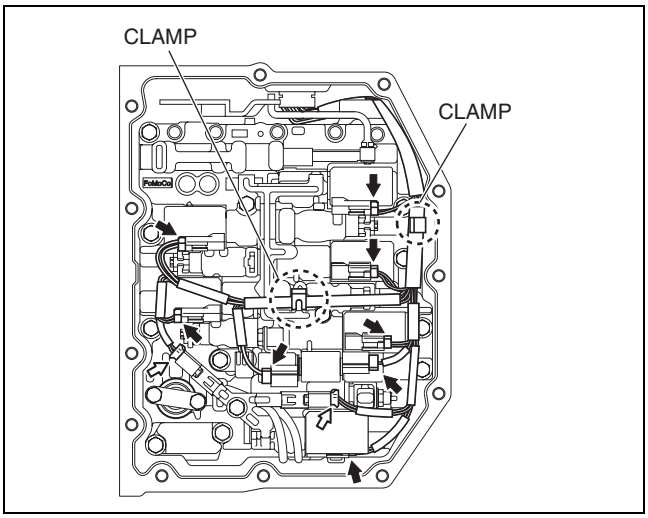
8. Connect the solenoid connectors, VSS connector and the input/turbine speed sensor connector.

9. Connect the coupler component to the clamps.

   **Note**
   - Completely remove sealant and oil with white gasoline or similar.

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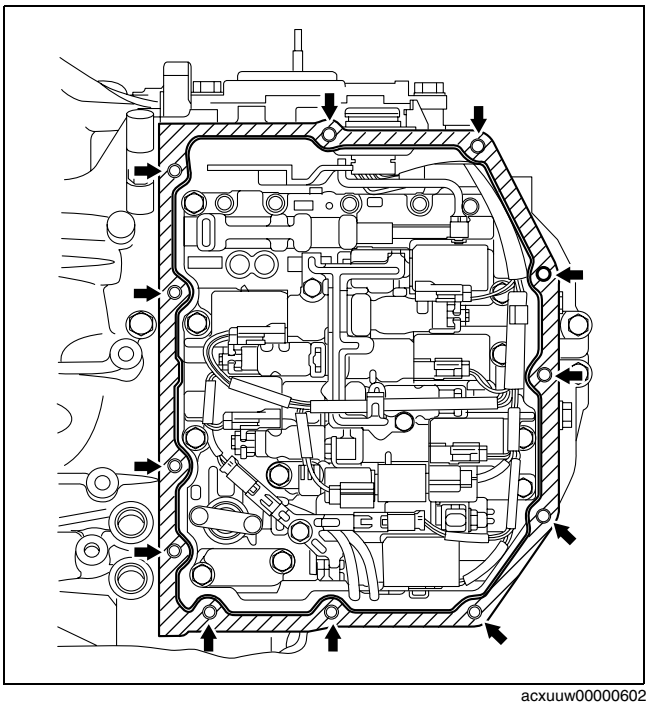
10. Clean sealant and oil off the contact surface of the transaxle case with the control valve body cover and the bolt holes.

    **Note**
    - Completely remove oil with white gasoline or similar.

11. Clean oil off the contact surface of the new control valve body cover with the transaxle case.



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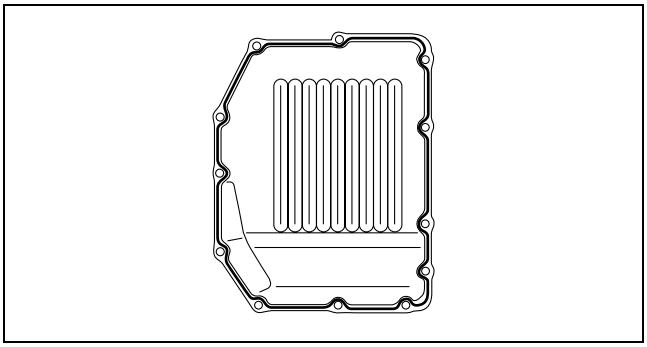
12. Apply sealant to the new control valve body cover as shown in the figure.

**Caution**
- **Be careful that the coupler component will not become caught between the control valve body cover and transaxle case.**



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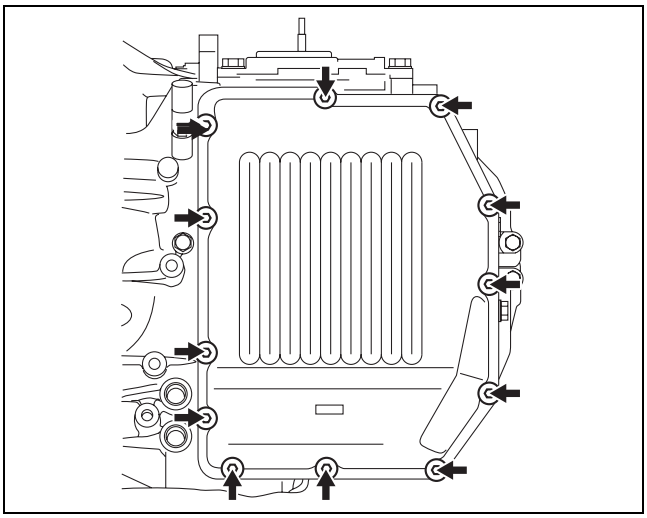
13. Install the new control valve body cover with new seal bolts.

**Tightening torque**
**9.8— 15.7 N·m {100— 160 kgf·cm, 87— 138 in·lbf}**



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14. Install the thermo valve. (See 05-17-47 OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
15. Install the resonance chamber. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/ INSTALLATION[L3 WITH TC].)
16. Install the TCM. (See 05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
17. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
18. Install the under cover.
19. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
20. Connect the negative battery cable.
21. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

**OIL SEAL (OIL PUMP) REPLACEMENT[AW6A-EL, AW6AX-EL]**

id051723800800

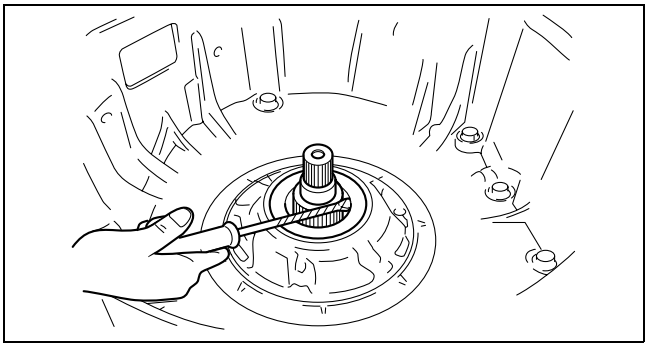
1. Remove the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

**Caution**
- **The oil seal is easily damaged by the sharp edges of the torque converter splines. Do not let the splines contact the oil seal.**
- **Do not drop the torque converter.**
- **Do not pinch fingers.**

2. Remove the torque converter. (See 05-17-46 TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

**Caution**
- **Do not to damage the bushing on the oil pump body.**

3. Using a tape-wrapped flathead screwdriver, remove the oil seal from the oil pump body.



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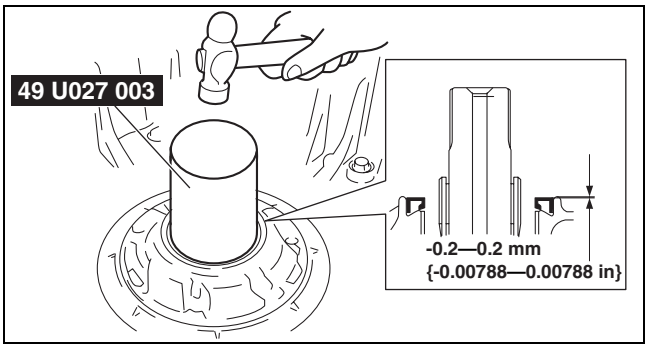
4. Using the **SST** and a hammer, install the oil seal to the oil pump body.
   **Substitution SST**
   - **49 U027 003**
     Outer diameter: 67 mm {2.64 in} or more
     Inner diameter: 54— 61 mm {2.13— 2.40 in}
     Plate thickness: 2 mm {0.08 in} or more
5. Coat the lip of the oil seal with grease.
6. Install the torque converter. (See 05-17-46 TORQUE CONVERTER REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
7. Install the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

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8. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

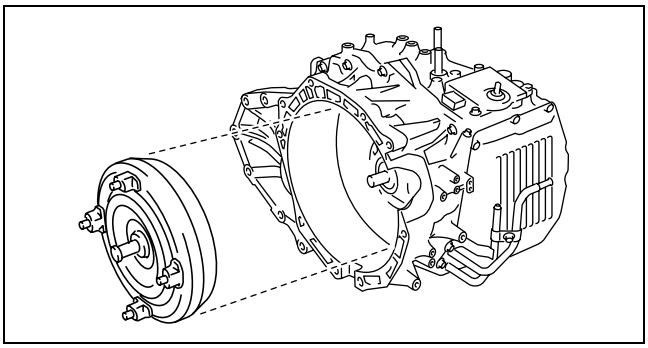
**TORQUE CONVERTER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

id051723800700

1. Remove the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

**Caution**
- **The oil seal is easily damaged by the sharp edges of the torque converter splines. Do not let the splines contact the oil seal.**
- **Do not drop the torque converter.**
- **Do not pinch fingers.**

2. Remove the torque converter, and immediately turn it so that the hole faces upward. This will help to keep any remaining fluid from spilling.
3. Drain any ATF remaining in the torque converter.
4. Using a flathead screwdriver, position the drive gear on the oil pump component in the center.
5. Install the torque converter to the transaxle.



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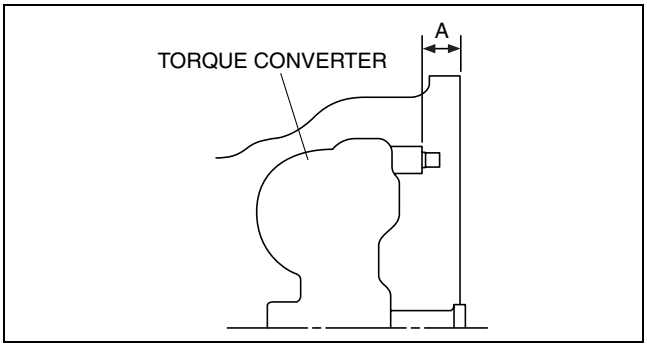
6. To ensure that the torque converter is installed accurately, measure distance A between the end of the torque converter and the end of the converter housing.

   **Distance A ((between the end of the torque converter and the end of the converter housing))**
   **31.4 mm {1.24 in}**



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7. Install the transaxle. (See 05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
8. Perform the mechanical system test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

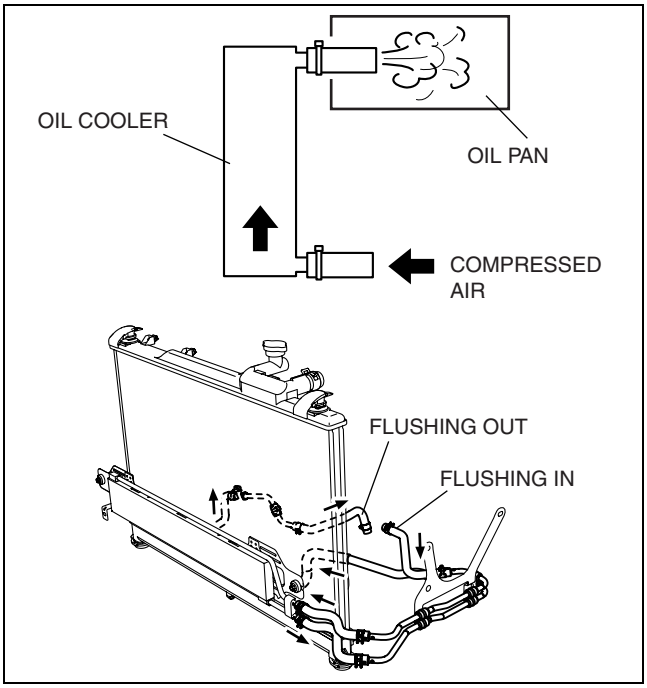
## OIL COOLER FLUSHING[AW6A-EL, AW6AX-EL]

id051723801500



**Note**
- If the automatic transaxle is replaced, flush and inspect the oil cooler.
- When replacing the automatic transaxle, inspect the oil cooler together with flushing it using the following procedure, and with the oil cooler hose removed.

1. Disconnect the oil cooler hose.
2. Set a clean oil pan up to the oil cooler hose inlet.
3. Blow **491—882 kPa {5—9 kgf/cm$^2$, 72—127 psi}** of compressed air from the oil cooler hose outlet to drain remaining oil.
4. Add new ATF from the oil cooler hose outlet and blow **491—882 kPa {5—9 kgf/cm$^2$, 72—127 psi}** of compressed air to flush. (Repeat 2 or 3 times)
5. Verify that none of the following foreign material is mixed in with the drained ATF:
   - Large metal fragments of $\phi$ 0.5 mm {0.02 mm} or more that cannot pass through the oil strainer
   - Fibrous clutch facing
6. Repeat the procedures from Step 1 to 2 and flush the inside of the oil cooler.
7. If foreign material such as metal fragments or clutch facing remains even after the oil cooler is flushed repeatedly, replace the oil cooler (radiator).



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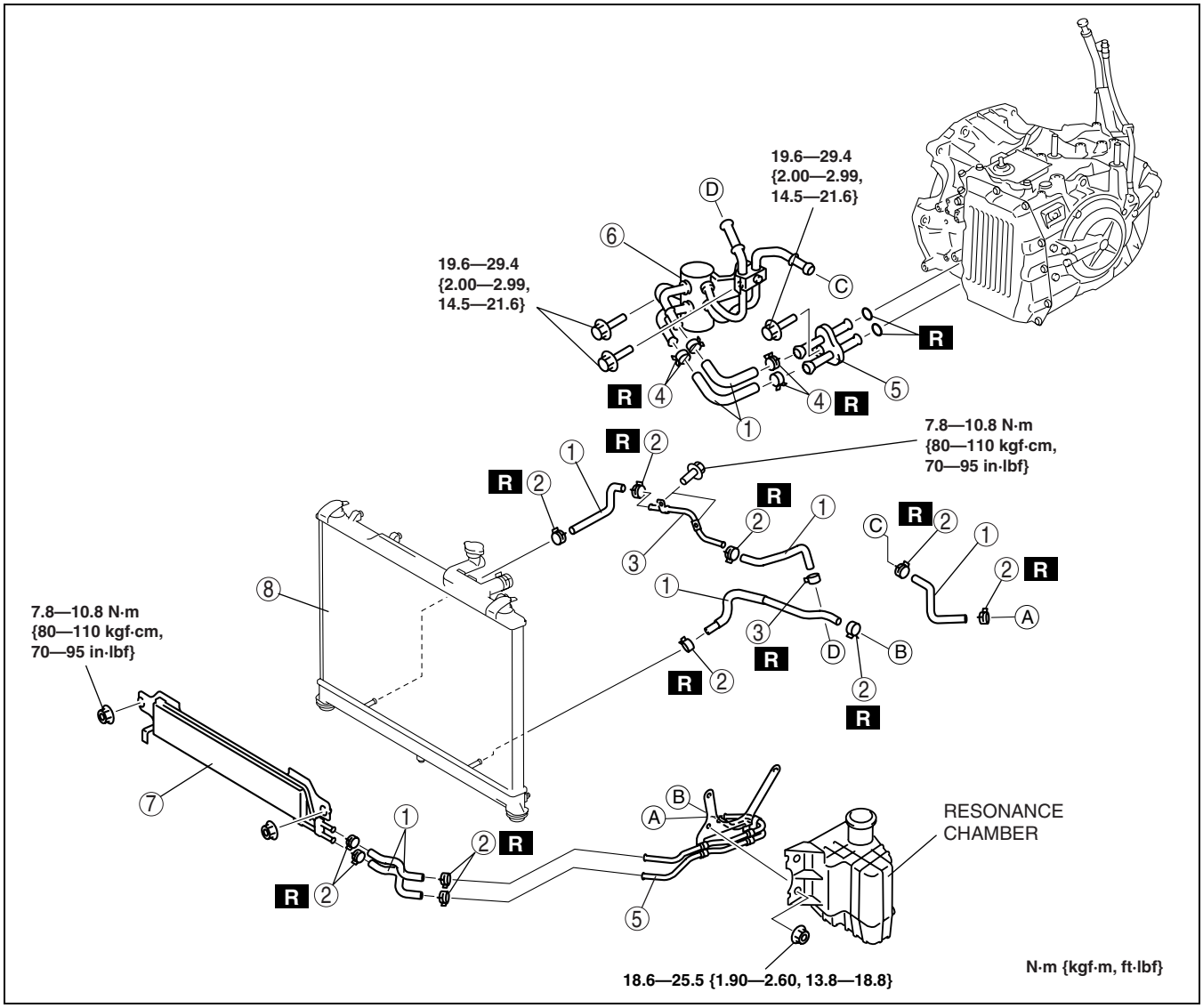
## OIL COOLER REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]

id051723801600

1. Disconnect the negative battery cable.
2. Remove the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove the under cover.
4. Drain the ATF into a container. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
5. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
6. Remove the following parts.
   (1) Front bumper (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
   (2) Splash shield
   (3) Resonance chamber (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove in the order indicated in the table.
8. Install in the reverse order of removal.
9. Add the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)

10. Add ATF to the specified level. (See 05-17-11 AUTOMATIC TRANSAXLE FLUID (ATF) REPLACEMENT[AW6A-EL, AW6AX-EL].)
11. Install the under cover.
12. Install the air cleaner component. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
13. Connect the negative battery cable.
14. Inspect for oil leakage from the oil pipes and oil hoses.
15. Inspect for coolant from the hoses.
16. Inspect for engine coolant leakage. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)
17. Inspect the ATF level and condition. (See 05-17-10 AUTOMATIC TRANSAXLE FLUID (ATF) INSPECTION[AW6A-EL, AW6AX-EL].)
18. Perform the line pressure test. (See 05-17-3 MECHANICAL SYSTEM TEST[AW6A-EL, AW6AX-EL].)

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| | |
|---|---|
| 1 | Oil hose (See05-17-49 Oil Pipe, Hose Clamp, Oil Hose Installation Note.) |
| 2 | Hose clamp A (See05-17-49 Oil Pipe, Hose Clamp, Oil Hose Installation Note.) |
| 3 | Hose clamp B (See05-17-49 Oil Pipe, Hose Clamp, Oil Hose Installation Note.) |

| | |
|---|---|
| 4 | Hose clamp C (See05-17-49 Oil Pipe, Hose Clamp, Oil Hose Installation Note.) |
| 5 | Oil pipe |
| 6 | Thermo valve |
| 7 | Oil cooler |
| 8 | Radiator (in tank oil cooler) (See 01-12-8 RADIATOR REMOVAL/ INSTALLATION[L3 WITH TC].) (See 05-17-49 Radiator (In Tank Oil Cooler) Installation Note.) |

**Radiator (In Tank Oil Cooler) Installation Note**

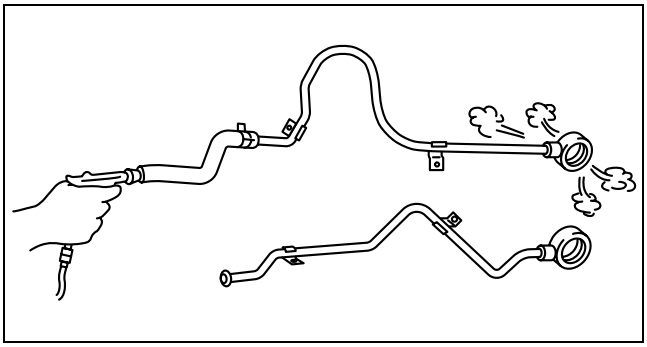
1. The automatic transaxle oil cooler flushing must be performed whenever a transaxle is removed for service because the existing fluid may be contaminated, and to prevent contamination of new fluid.

   **Note**
   - Flushing must be performed after installation of an overhauled or replaced transaxle.

2. Follow the instructions in the manufacturer's publication for flushing operation.

**Oil Pipe, Hose Clamp, Oil Hose Installation Note**

1. Apply compressed air to the cooler-side opening, and blow any remaining grime and foreign material from the cooler pipes. Compressed air should be applied for no **less than 1 min**.



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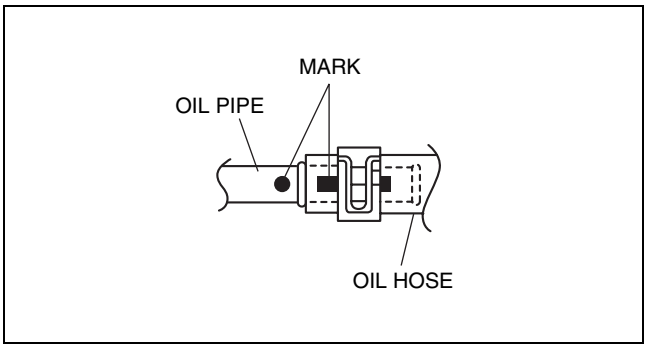
2. Align the marks, and slide the oil hose onto the oil pipe until it is fully seated as shown in the figure.

   **Note**
   - If reusing the hose, install the new hose clamp exactly on the mark left by the previous hose camp.

3. Install the new hose clamp onto the hose.

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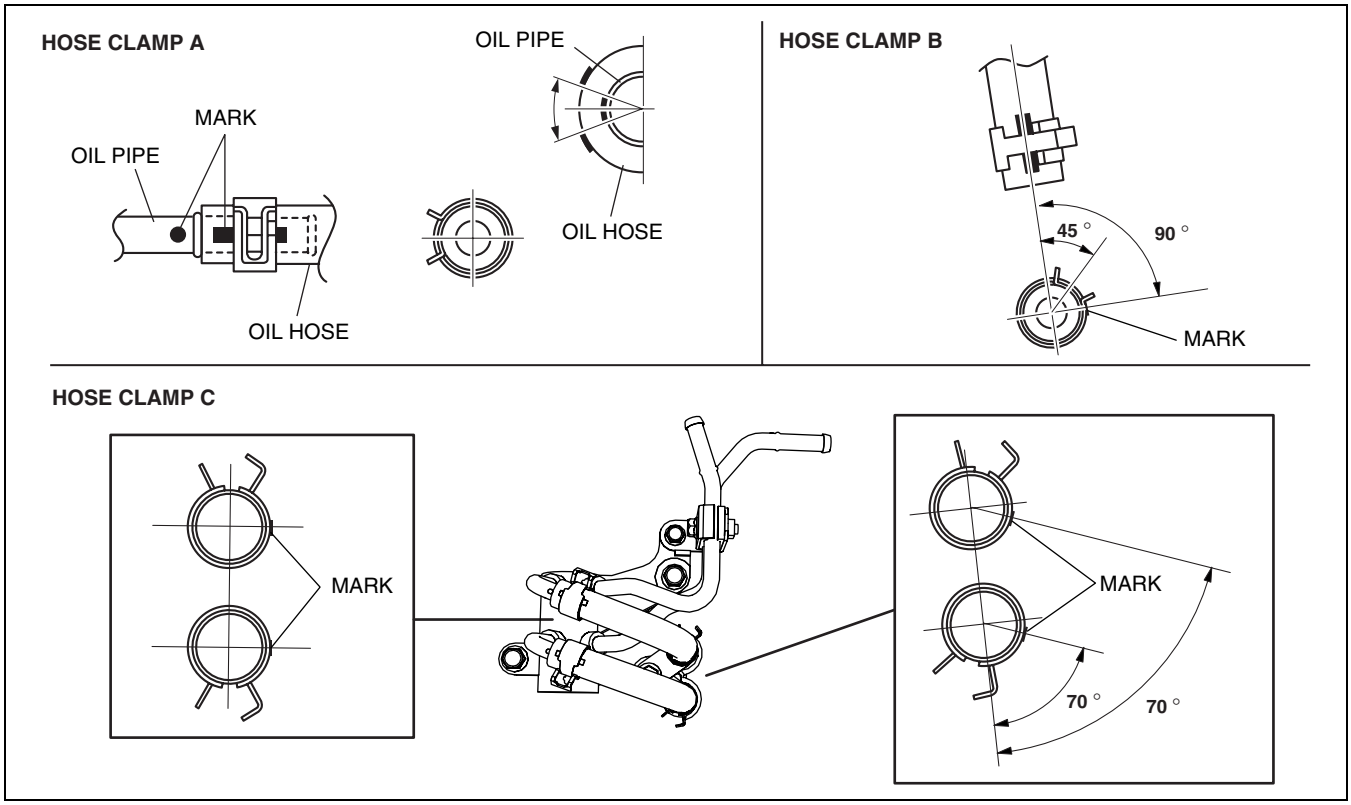


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4. Verify that the hose clamp does not interfere with any other components.

### OIL COOLER DISASSEMBLY/ASSEMBLY[AW6A-EL, AW6AX-EL]

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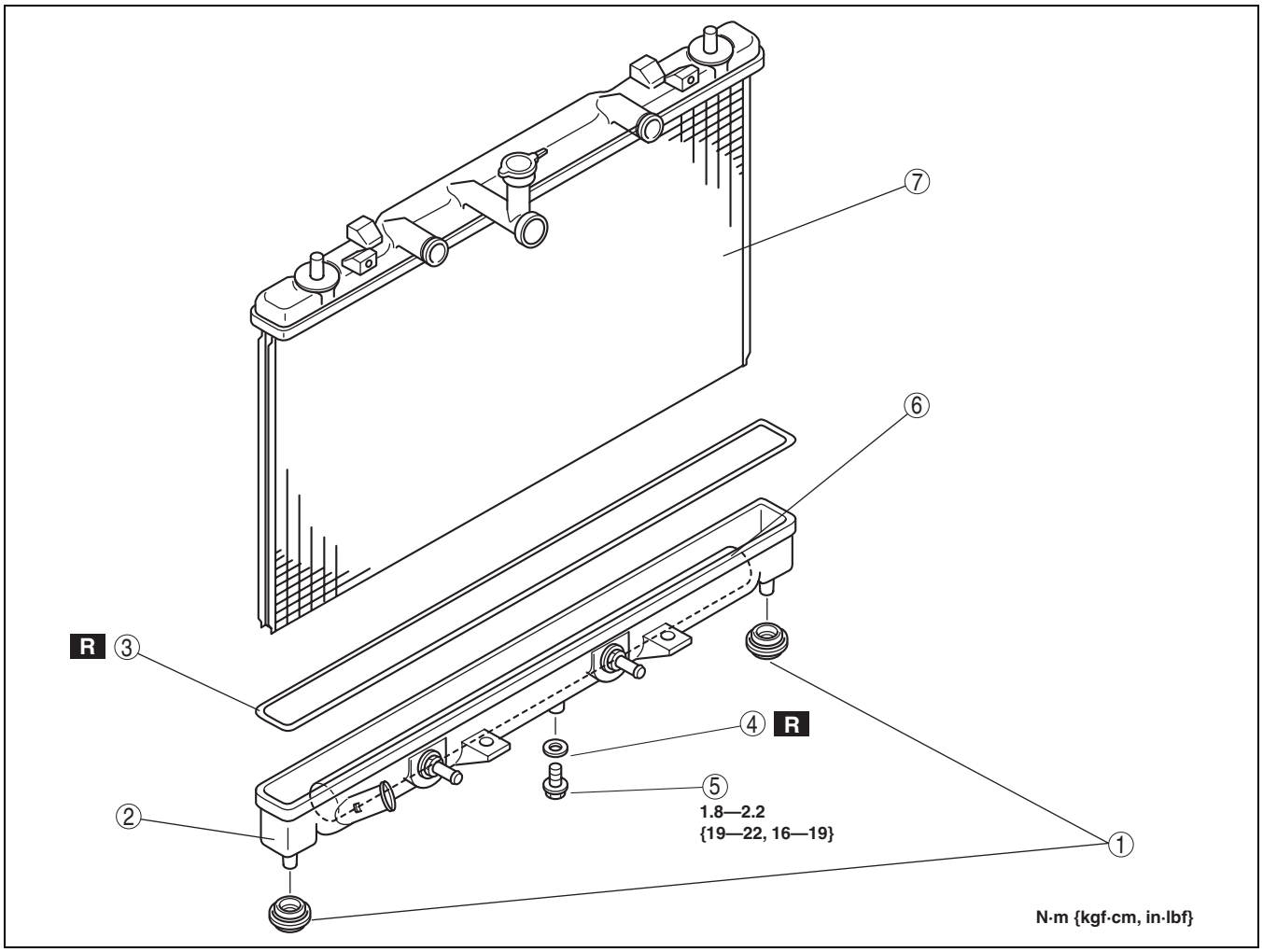
1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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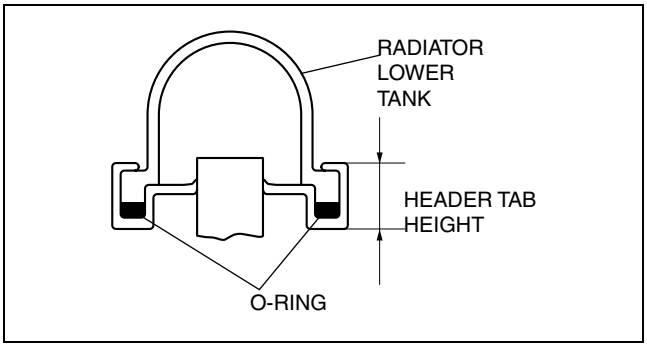
| | |
|---|---|
| 1 | Mount rubber |
| 2 | Radiator outer tank (in tank oil cooler)<br>(See 05-17-51 Radiator Outer Tank (In Tank Oil Cooler) Removal Note.)<br>(See 05-17-51 Radiator Outer Tank (In Tank Oil Cooler) Installation Note.) |
| 3 | O-ring |
| 4 | Washer |

| | |
|---|---|
| 5 | Drain cock |
| 6 | ATF cooler |
| 7 | Radiator |

**Radiator Outer Tank (In Tank Oil Cooler) Removal Note**

1. Inspect the height of the header tabs.
2. Insert the end of a medium tip screwdriver between the end of the header tab and the outer tank.

**Note**
- Do not open more tabs than necessary for tank removal.

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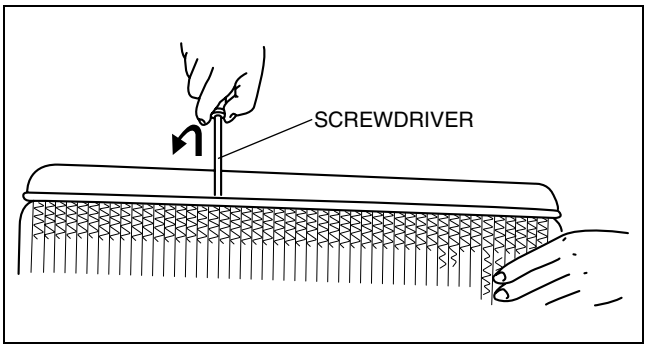
3. Pivot the screwdriver to pry the tab away from the tank and repeat the procedure for each tab.
4. Remove the radiator outer tank and O-ring (gasket) from the core header when all of the tabs are opened.

**Note**
- If any header tabs are missing from the core, replace the radiator.

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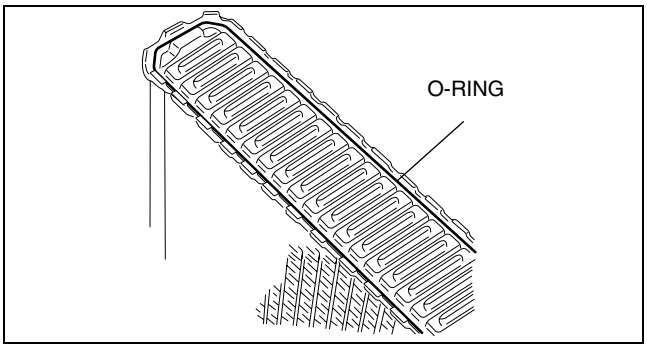
5. Inspect the gasket surface of the radiator core header to ensure it is clean and free of foreign material or damage.
6. Inspect the radiator outer tank for warping. If it is warped, replace radiator tank.

**Radiator Outer Tank (In Tank Oil Cooler) Installation Note**

1. Install a new O-ring and ensure it is not twisted.
2. Position the radiator tank in the original direction to the core using care not to scratch the tank sealing surface with the header tabs.

**Note**
- Step 3 will set jaw opening to the correct specification.

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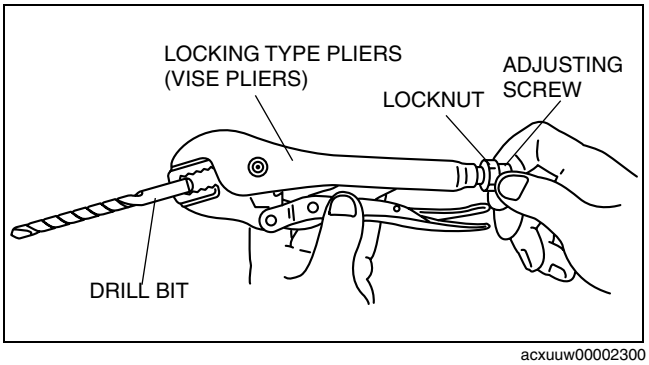
3. With the jaws of locking-type pliers (vise grips) closed and locked, turn the adjusting screw to position the jaws against the drill bit with the diameter measured (height) in the removal procedure 1. Tighten the lock nut on the adjusting screw against the handle to lock the adjustment in place.

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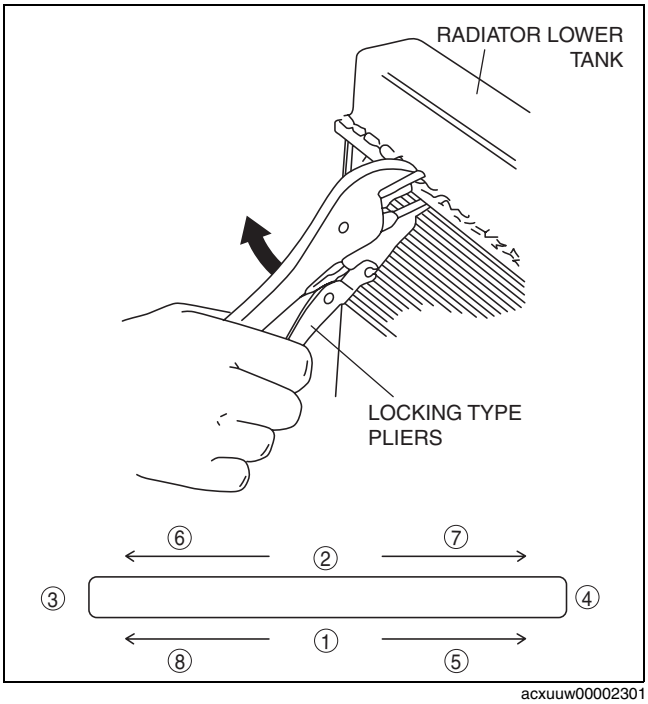
4. Squeeze the header tabs down in the order as shown against the lip of the radiator outer tank base with the locking-type pliers while rotating the pliers toward the tank.

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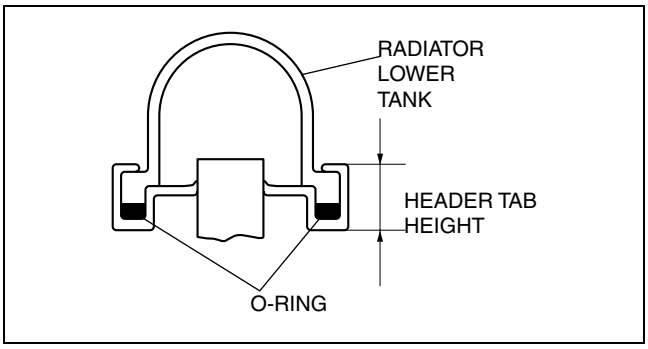
5. Verify that the height of the header tabs is same as the height before removal.
6. Inspect for leakage from radiator. (See 01-12-6 ENGINE COOLANT LEAKAGE INSPECTION[L3 WITH TC].)

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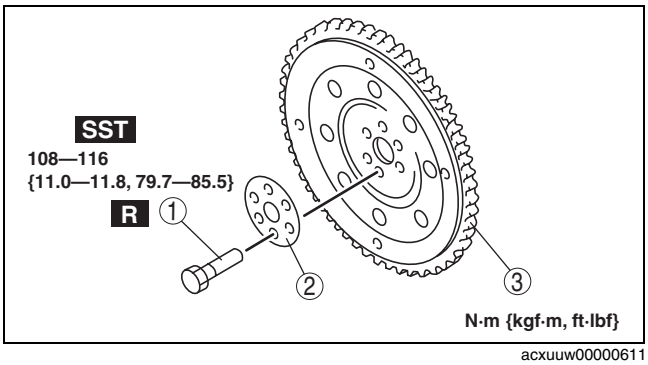
**DRIVE PLATE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL]**

id051723802500

1. Remove the transaxle. (See05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)
2. Remove in the order indicated in the figure.

| | |
|---|---|
| 1 | Drive plate mounting bolts<br>(See05-17-53 Drive Plate Mounting Bolts Removal Note.) |
| 2 | Backing plate |
| 3 | Drive plate<br>(See05-17-53 Drive Plate Installation Note.) |

3. Install in the reverse order of removal.

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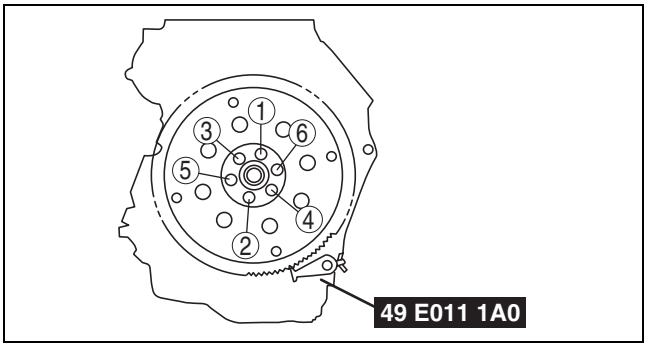
**Drive Plate Mounting Bolts Removal Note**

1. Set the **SST** or equivalent against the drive plate.
2. Remove the bolts and the drive plate.

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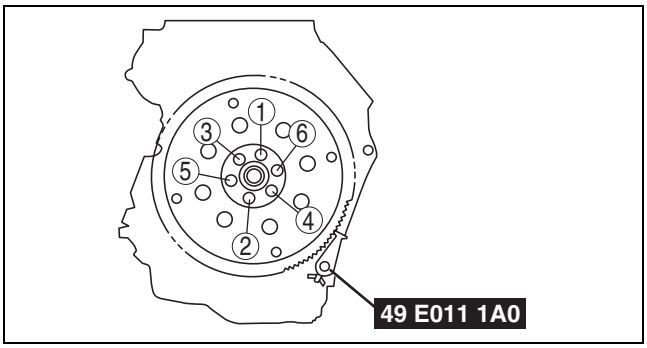
**Drive Plate Installation Note**

1. Remove the sealant from the bolt holes in the crankshaft and from the drive plate mounting bolts.
2. Install the drive plate.
3. Install the backing plate.
4. Set the **SST** or equivalent against the drive plate.
5. Tighten the new drive plate mounting bolts in two or three steps in the order shown.

   **Tightening torque**
   **108— 116 N·m {11.0— 11.8 kgf·m, 79.7— 85.5 ft·lbf}**

6. Install the transaxle. (See05-17-29 AUTOMATIC TRANSAXLE REMOVAL/INSTALLATION[AW6A-EL, AW6AX-EL].)

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# 05-18 AUTOMATIC TRANSAXLE SHIFT MECHANISM

**AUTOMATIC TRANSAXLE SHIFT MECHANISM LOCATION INDEX. . . . . 05-18–1**
**SHIFT-LOCK INSPECTION. . . . . 05-18–2**
**KEY INTERLOCK INSPECTION. . . . . 05-18–2**
**INTERLOCK CABLE INSPECTION . . . . 05-18–2**
**INTERLOCK CABLE ADJUSTMENT . . . 05-18–2**
**SELECTOR LEVER INSPECTION . . . . . 05-18–6**
**SELECTOR LEVER COMPONENT INSPECTION . . . . . 05-18–6**
**SELECTOR CABLE ADJUSTMENT . . . . 05-18–7**
**SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION . . . . . 05-18–7**
Selector Cable Removal Note . . . . . 05-18–9
Selector Cable Installation Note . . . . . 05-18–9
Interlock Cable Installation Note . . . . . 05-18–10

## AUTOMATIC TRANSAXLE SHIFT MECHANISM LOCATION INDEX

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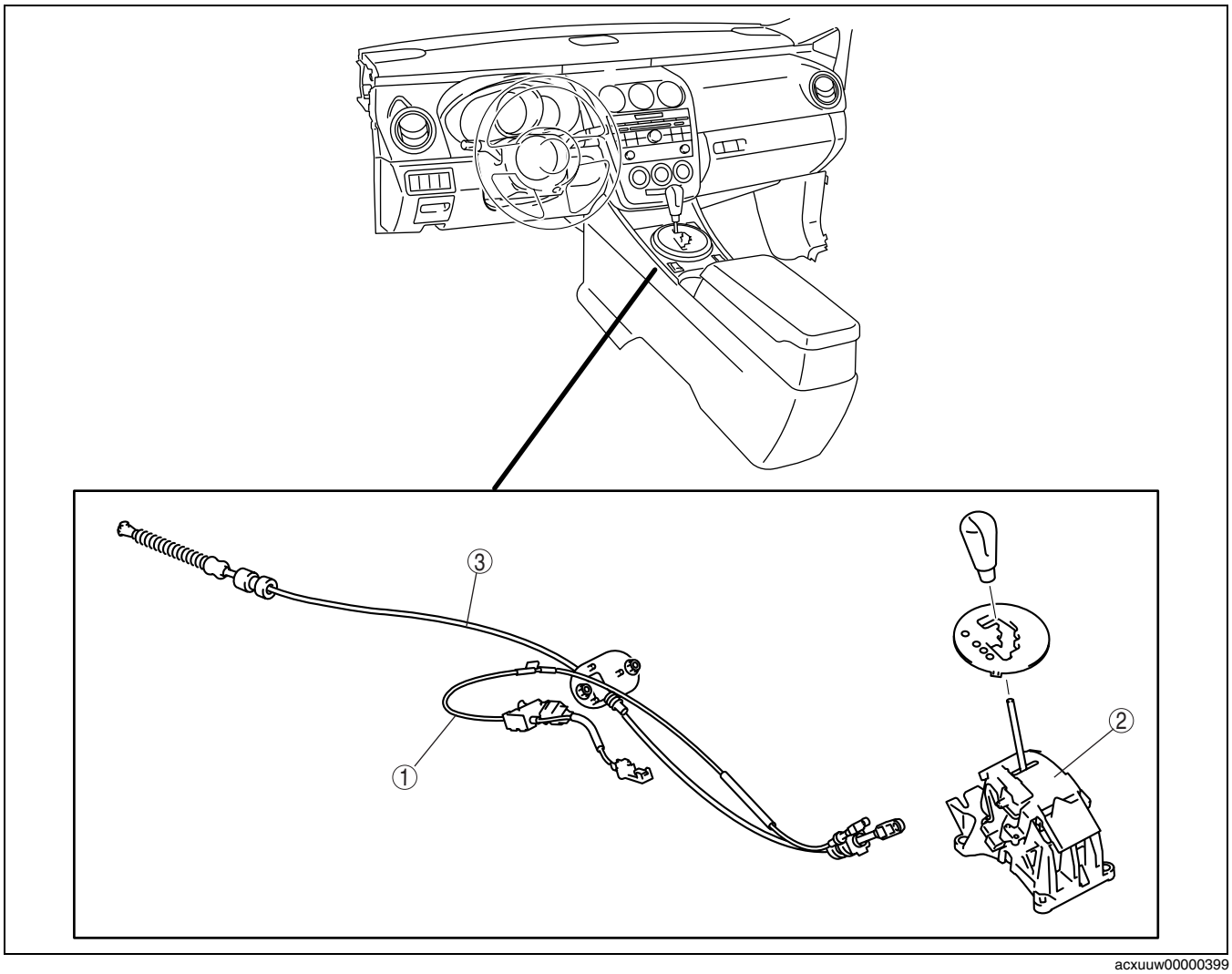


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| | |
|---|---|
| 1 | Interlock cable<br>(See05-18-2 KEY INTERLOCK INSPECTION.)<br>(See05-18-2 INTERLOCK CABLE INSPECTION.)<br>(See05-18-2 INTERLOCK CABLE ADJUSTMENT.) |

| | |
|---|---|
| 2 | Selector lever<br>(See05-18-2 SHIFT-LOCK INSPECTION.)<br>(See05-18-6 SELECTOR LEVER INSPECTION.)<br>(See05-18-6 SELECTOR LEVER COMPONENT INSPECTION.)<br>(See05-18-7 SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION.) |
| 3 | Selector cable<br>(See05-18-2 INTERLOCK CABLE ADJUSTMENT.) |

### SHIFT-LOCK INSPECTION

id051800800400

1. Turn the ignition switch to the ON position.
2. Verify that the selector lever is in the P position.
3. Verify that the selector lever cannot be shifted from the P position without depressing the brake pedal.
4. Depress the brake pedal and verify that the selector lever cannot be shifted from the P position.
   - If there is any malfunction, inspect the interlock cable. (See 05-18-2 INTERLOCK CABLE INSPECTION.)

### KEY INTERLOCK INSPECTION

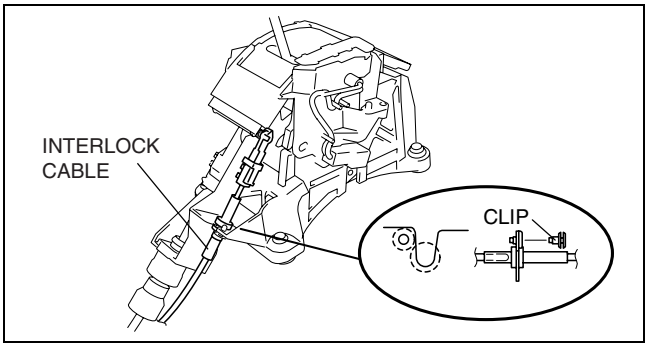
id051800800100

1. Verify that the ignition key cannot be pulled out except in the P position.
   - If there is any malfunction, inspect the interlock cable. (See 05-18-2 INTERLOCK CABLE INSPECTION.)

### INTERLOCK CABLE INSPECTION

id051800800200

1. Turn the ignition switch to the ON position. (Engine off)
2. Remove the clip of the selector lever base plate, then remove the interlock cable from the U-groove.
3. Remove the interlock cable from the selector lever.

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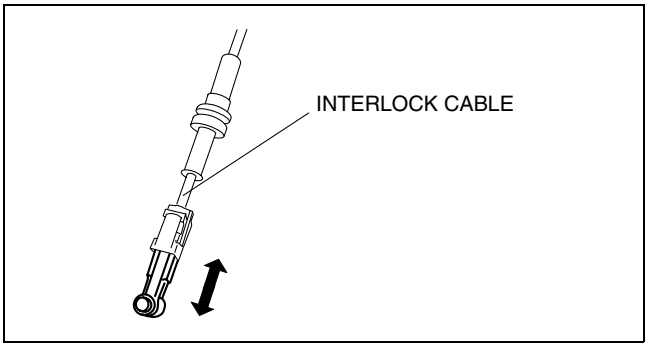
4. Verify that the interlock cable moves freely with the brake pedal depressed.
   - If there is any malfunction, inspect the interlock cable for abnormal winding. If any abnormal winding found, correct it.
   - If the malfunction persists after correcting the interlock cable winding, replace it.

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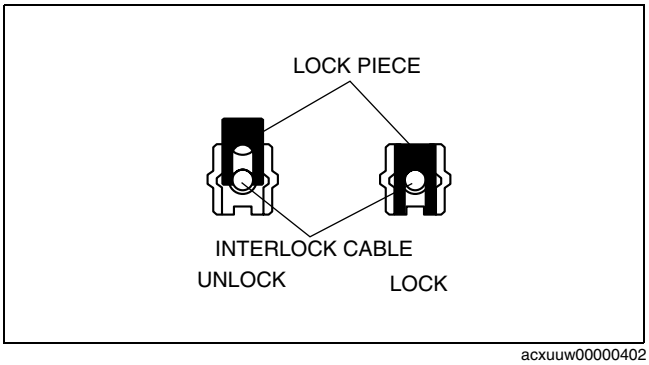
### INTERLOCK CABLE ADJUSTMENT

id051800800300

1. Turn the ignition switch to the ON position. (Engine off)
2. Pull up the lock piece of the interlock cable to release the lock.

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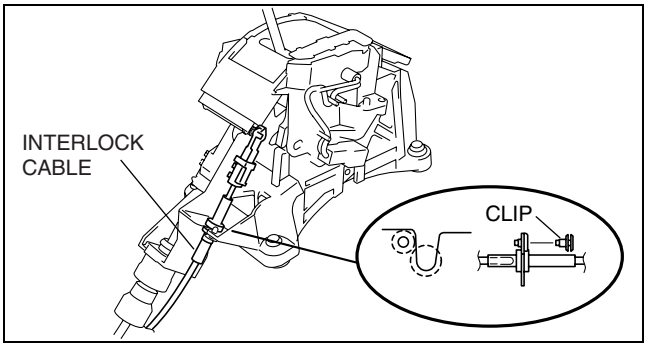
3. Remove the clip of the selector lever base plate, then remove the interlock cable from the U-groove.
4. Remove the interlock cable from the selector lever.

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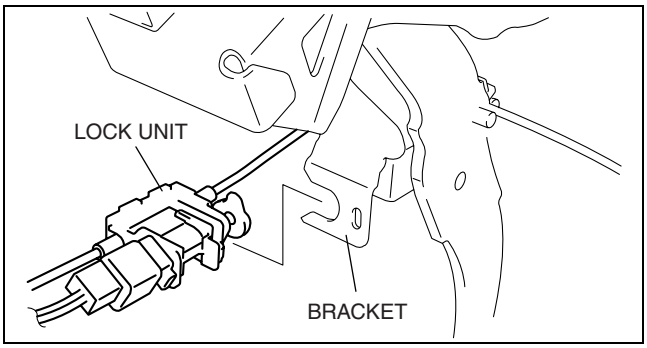
5. Remove the lock unit from the bracket.

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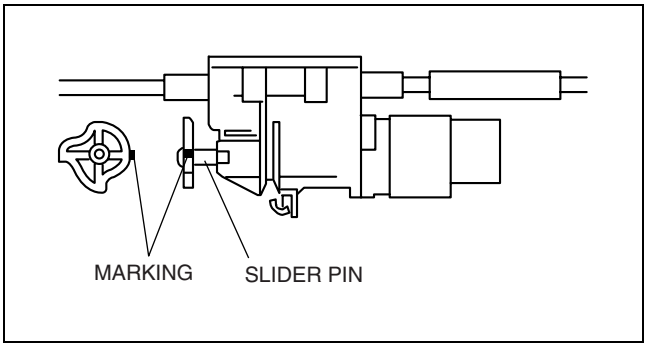
6. Verify that the marking on the slider pin is positioned as shown in the figure.

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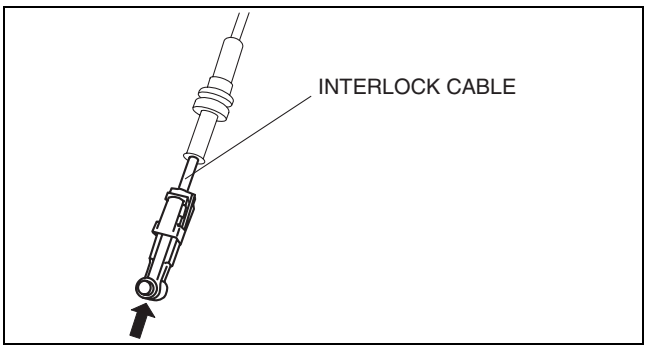
7. Push the interlock cable.

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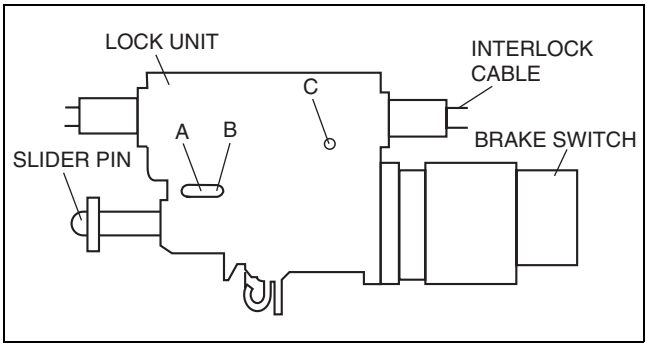
8. Insert the a 1.5mm {0.059 in} round bar or similar into hole A with the slider pin fully pushed in.

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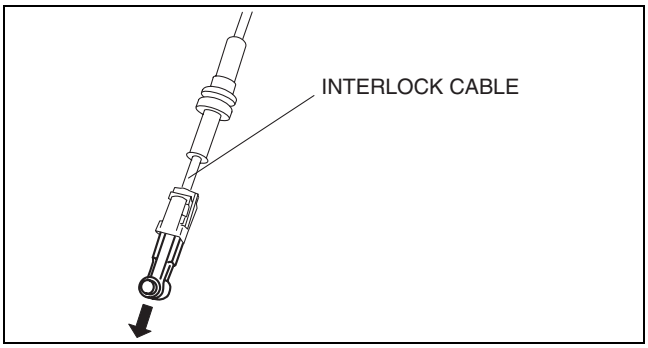
9. Fully pull the end of the interlock cable.

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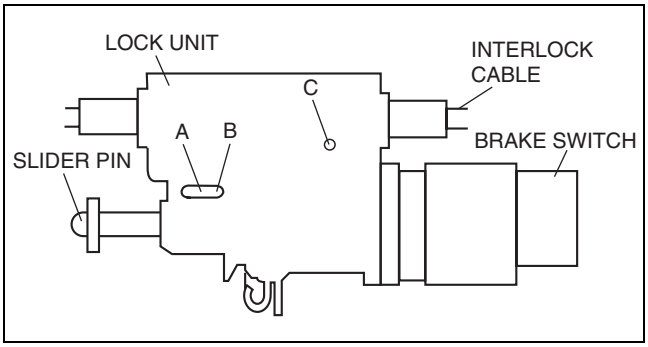
10. Push the a 1.5mm {0.059 in} round bar or similar into hole B and hole C of the lock unit until it passes through.
11. Disconnect the brake switch connector.
12. Remove the brake switch. (See04-11-6 BRAKE PEDAL REMOVAL/INSTALLATION.)
13. Install a new brake switch. (See04-11-6 BRAKE PEDAL REMOVAL/INSTALLATION.)

**Caution**
- **Do not connect the brake switch connector until the interlock cable adjustment is completed.**

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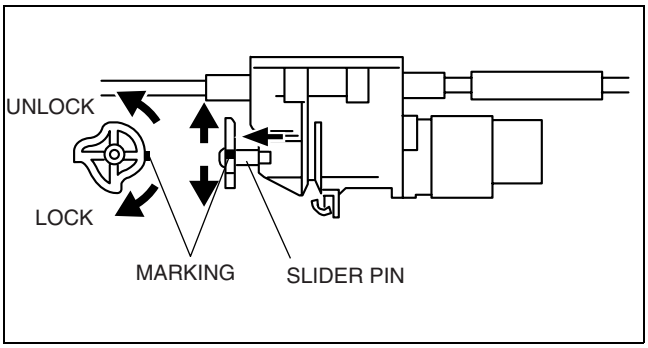
14. Install the lock unit to the bracket. (See05-18-10 Interlock Cable Installation Note.)
15. Rotate the slider pin to release the lock and verify that it slides freely.
16. Verify that the slider pin contacts the brake pedal stopper rubber and rotate the slider pin to lock.

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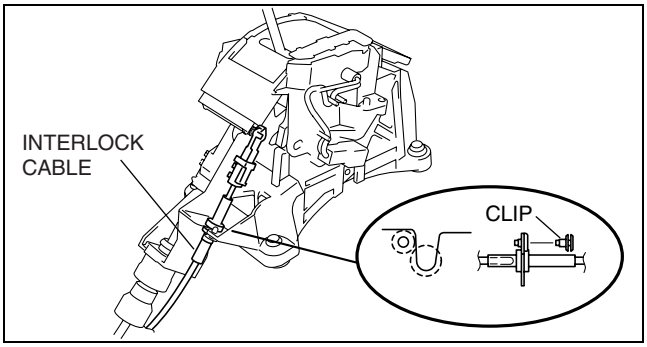
17. Install the interlock cable end to the interlock link on the selector lever.
18. Fit the interlock cable in the U-groove in the selector lever base plate and install the clip.



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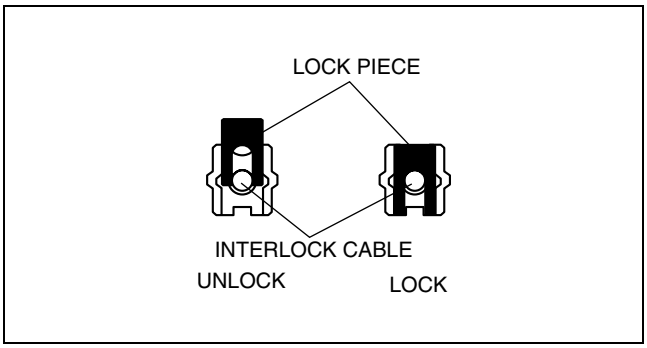
19. Press the interlock cable lock piece in until it is locked.

**Caution**
- **Applying a load to the interlock cable while pressing the lock piece in can affect the lock unit operation.**



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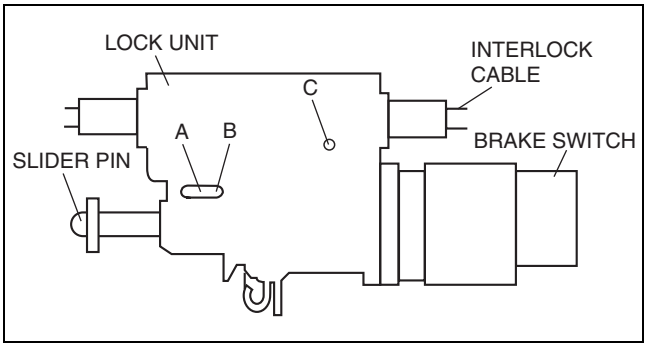
20. Remove the a 1.5mm {0.059 in} round bar or similar from the lock unit holes A, B, and C.
21. Connect the brake switch connector with the brake pedal released.



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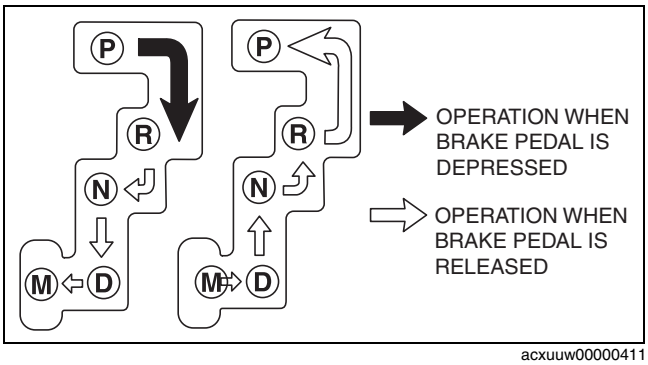
**Caution**
- **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch connector is connected after the brake switch has been properly installed. If the brake switch is not properly installed or the connector is connected before installation, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake switch is properly installed before connecting the connector.**
- **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.**

22. Inspect shift lock operation. (See05-18-2 SHIFT-LOCK INSPECTION.)

## SELECTOR LEVER INSPECTION

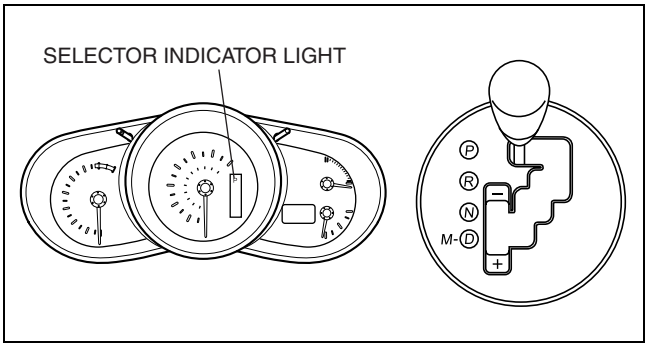
id051800800500

1. Turn the ignition switch to the ON position. (engine OFF)
2. With the brake pedal depressed, verify that there is a “click” at each range when shifted.
3. Verify that the selector lever can be shifted.
4. Verify that there is a “click” at each position when shifted from P position to M range.




acxuuw00000411

5. Verify that the positions of the selector lever and the indicator are aligned.
   - If there is any malfunction, adjust the TR switch. (See05-17-25 TCM REMOVAL/ INSTALLATION[AW6A-EL, AW6AX-EL].)
6. Verify that the vehicle operates in each selected range.

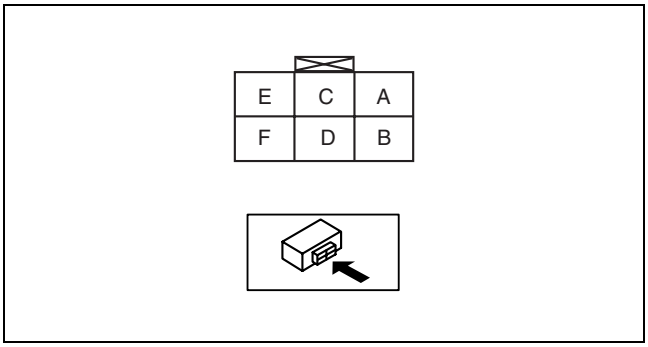



acxuuw00000412

## SELECTOR LEVER COMPONENT INSPECTION

id051800800600

1. Disconnect the negative battery cable.
2. Remove the center console.
3. Remove the dashboard completely. (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
4. Disconnect the selector lever component connector.
5. Inspect for continuity at the selector lever component.
   - If there is any malfunction, adjust the selector cable. (See 05-18-7 SELECTOR CABLE ADJUSTMENT.)




acxuuw00002533

○——○ : Continuity

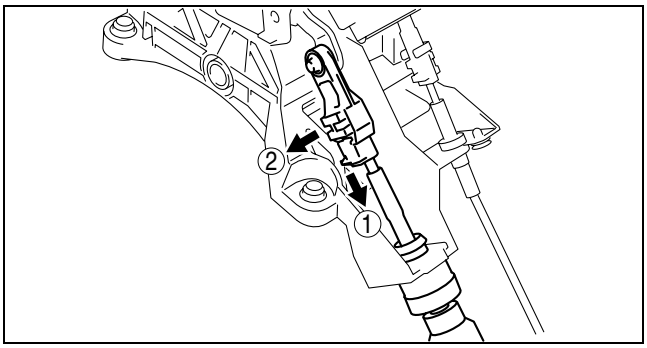
| Selector lever position/range | | Connector terminal | | | | | |
|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F |
| M range | - M | | ○ | | ○ | | |
| | center M | | | ○ | ○ | | |
| | + M | ○ | | | ○ | | |
| Other | | | | | | | |

D6U518ZW7002

## SELECTOR CABLE ADJUSTMENT

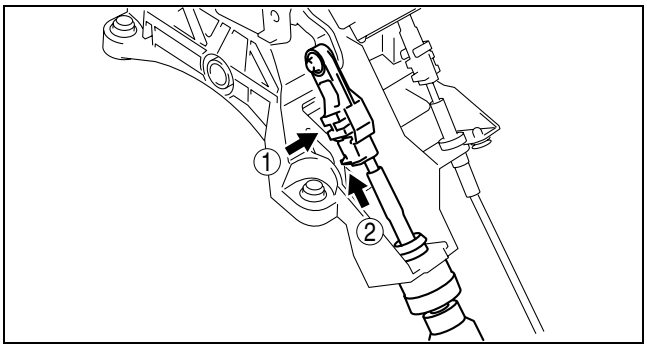
id051800800700

1. Remove the center console.
2. Shift the selector lever to P position.
3. Unlock the lock piece of the selector cable (selector lever side) in the order shown in the figure.
4. Verify that the manual shaft is in P position.




acxuuw00000413

5. Lock the lock piece of the selector cable (selector lever side) in the order shown in the figure.
6. Install the center console.
7. Shift the selector lever from P position to M range, and make sure that there are no other components in that area to interfere with the lever.




acxuuw00000414

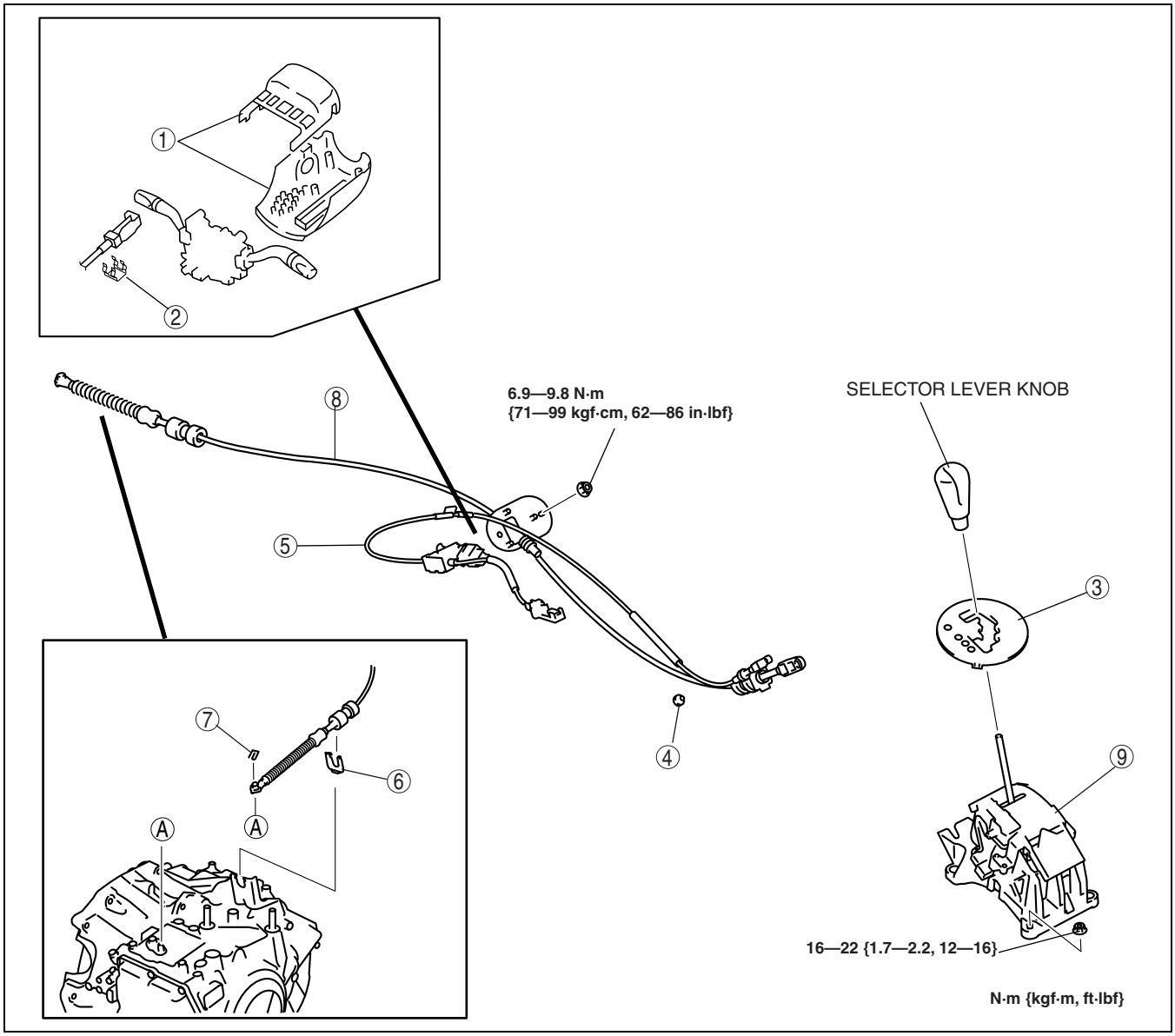


## SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION

id051800800800

1. Disconnect the negative battery cable.
2. Remove the following parts.
   (1) Battery and battery tray
   (2) Air cleaner component (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   (3) Selector lever knob
   (4) Center console
   (5) Driver side under panel
   (6) Accelerator pedal (See 01-13-17 ACCELERATOR PEDAL REMOVAL/INSTALLATION[L3 WITH TC].)
3. Remove in the order shown in the figure.

4. Install in the reverse order of removal.



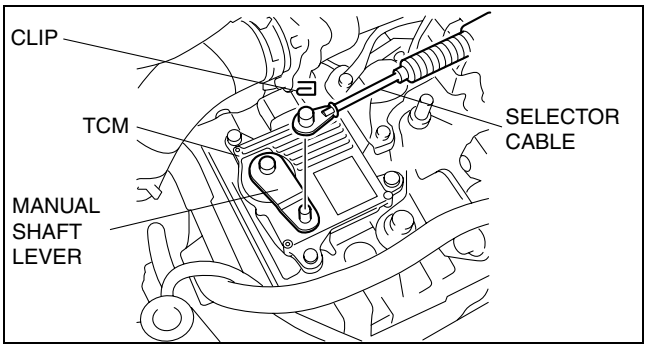

acxuuw00000415

| | |
|---|---|
| 1 | Column cover |
| 2 | Clip |
| 3 | Indicator panel |
| 4 | Clip |
| 5 | Interlock cable<br>(See05-18-10 Interlock Cable Installation Note.) |

| | |
|---|---|
| 6 | Clip |
| 7 | Clip |
| 8 | Selector cable<br>(See05-18-9 Selector Cable Removal Note.)<br>(See05-18-9 Selector Cable Installation Note.) |
| 9 | Selector lever component |

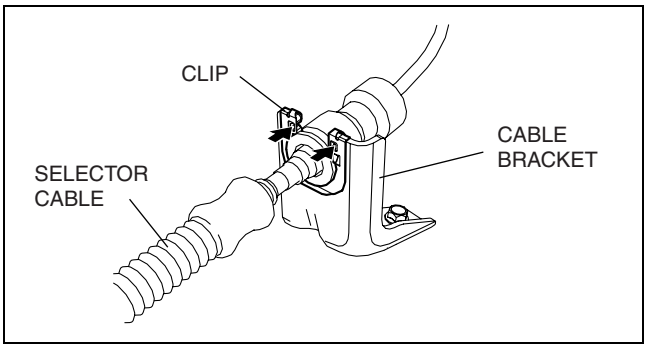
**Selector Cable Removal Note**

1. Remove the clip.
2. Remove the selector cable.




acxuuw00000416

3. Remove the selector cable from the cable bracket.




acxuuw00002399

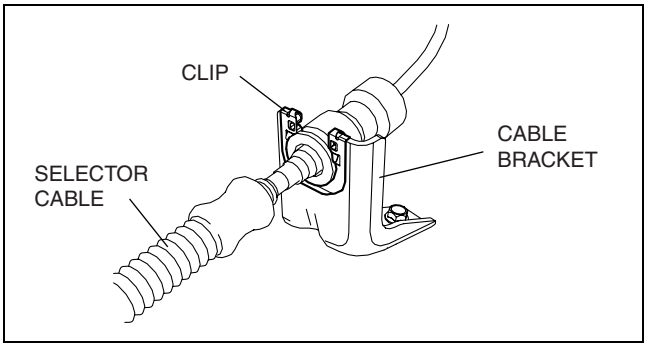


**Selector Cable Installation Note**

1. Install the selector cable and clip to the bracket as shown in the figure.

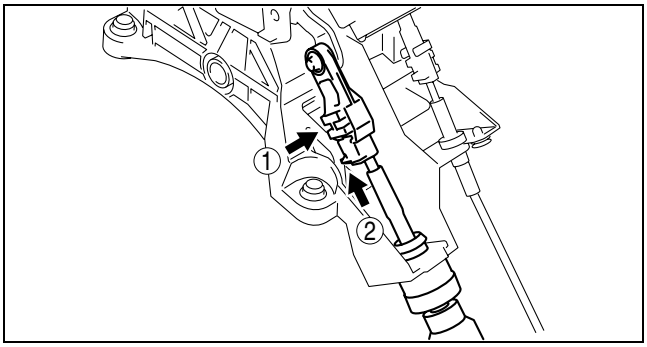
   **Note**
   - Steps 2 and 3 are for the selector cable replacement only.

2. Verify that the selector lever is in the P position.




acxuuw00002400

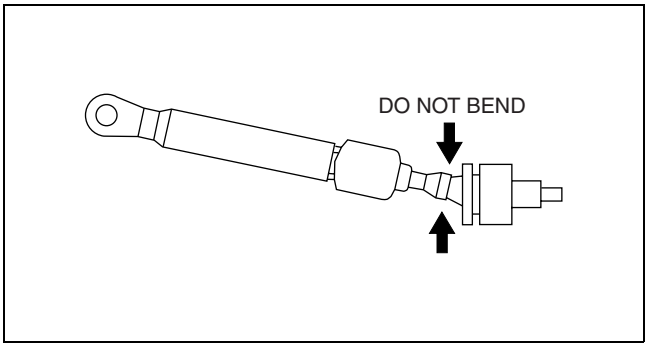
3. Lock the lock piece of the selector cable (selector lever side) in the order shown in the figure.




acxuuw00000419

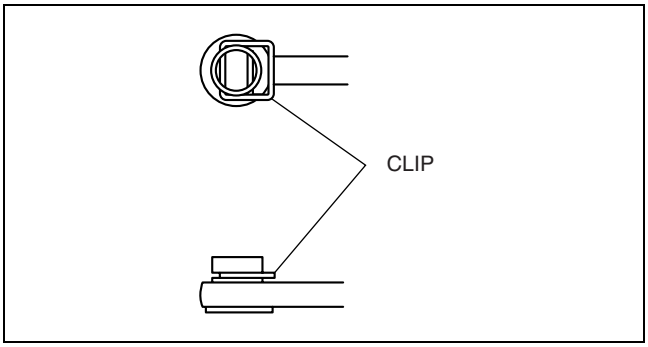
4. Verify that the manual shaft is in the P position.

**Caution**
- **Bending the selector cable in the manner shown in the figure will damage the cable and it may become loose when shifted. When installing the selector cable, hold it straight.**



acxuuw00000432

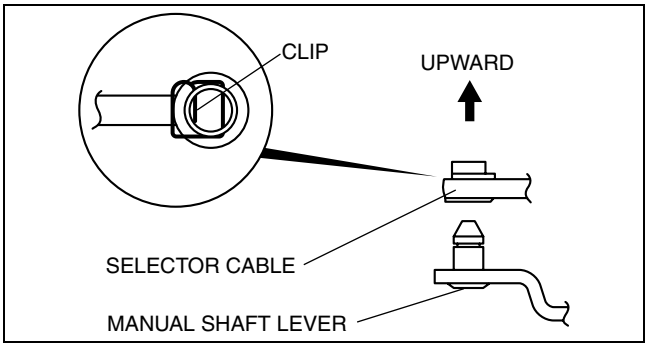
5. Install the clip as shown in the figure.



acxuuw00000433

**Note**
- Install the selector lever to the manual shaft lever with the clip side of the selector cable end facing up.

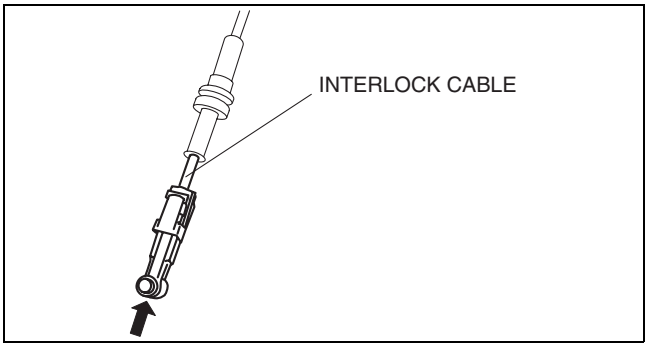
6. Install the selector lever to the manual shaft lever so that no load acts on the selector cable.
7. Confirm that the tip of the manual shaft lever projects out of the end of the selector cable.
8. Securely install the selector cable to the selector cable bracket.



acxuuw00000422

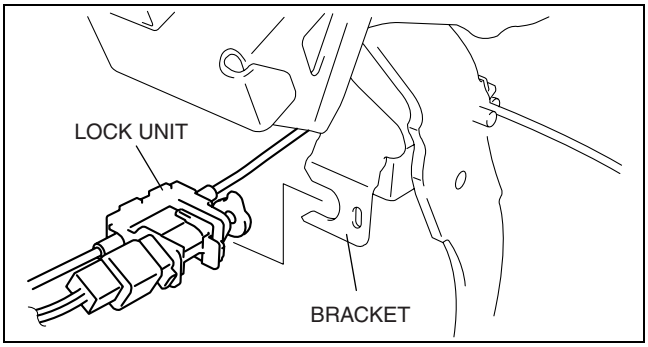
**Interlock Cable Installation Note**

1. Push the interlock cable.



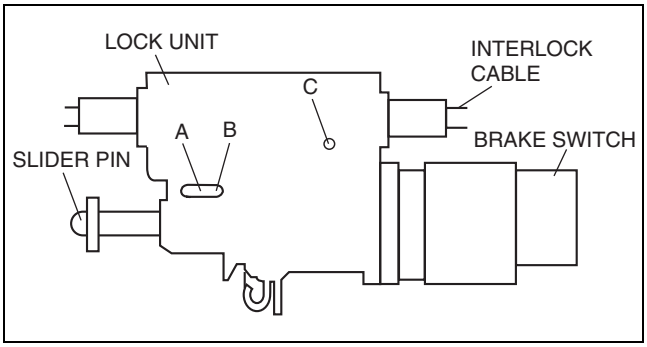
acxuuw00000423

2. Verify that the marking on the slider pin is positioned as shown in the figure.



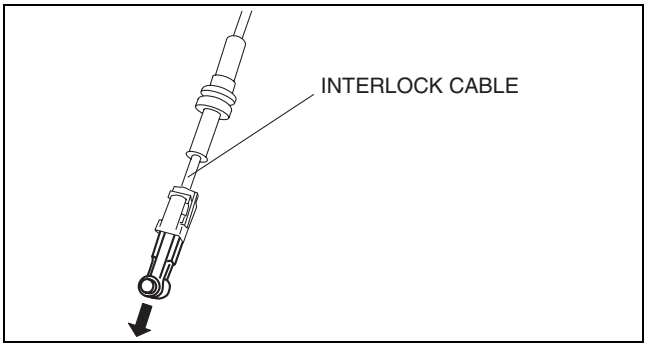
acxuuw00000424

3. Push the a 1.5mm {0.059 in} round bar or similar into hole A by fully pushing the slider pin in.




acxuuw00000425

4. Fully pull the end of the interlock cable.

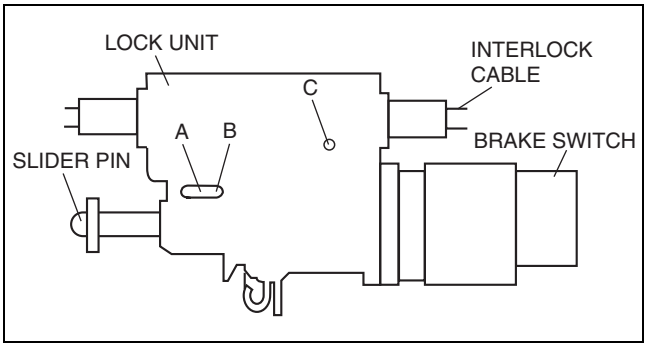



acxuuw00000426



5. Push the a 1.5mm {0.059 in} round bar or similar into hole B and hole C of the lock unit until it passes through.
6. Disconnect the brake switch connector.
7. Remove the brake switch. (See 04-11-6 BRAKE PEDAL REMOVAL/INSTALLATION.)
8. Install a new brake switch. (See 04-11-6 BRAKE PEDAL REMOVAL/INSTALLATION.)

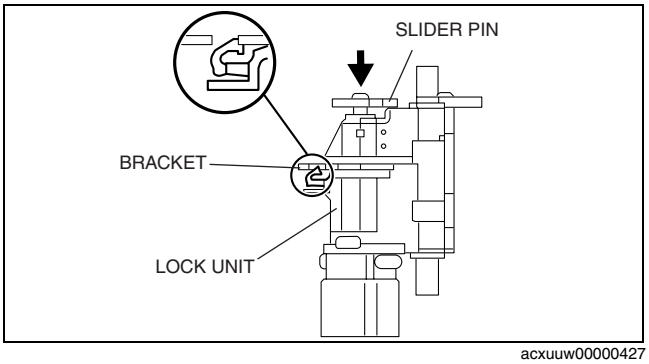
**Caution**
- **Do not connect the brake switch connector until the interlock cable is installed.**




acxuuw00000425

9. With the slider pin pressed, slide the lock unit to fix the lock unit hook into the bracket hole securely as shown in the figure.

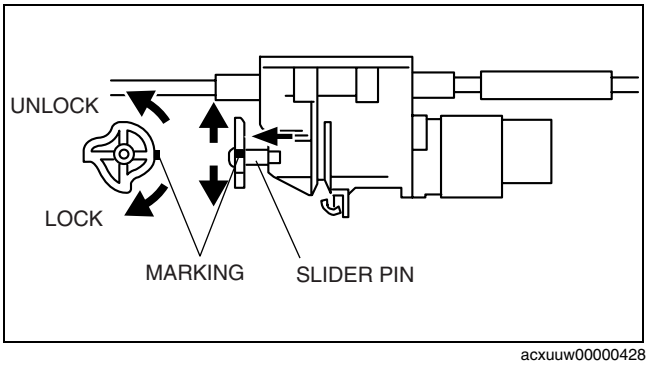
**Caution**
- **Allowing the interlock cable to be bent or twisted during installation can affect the lock unit operation.**




acxuuw00000427

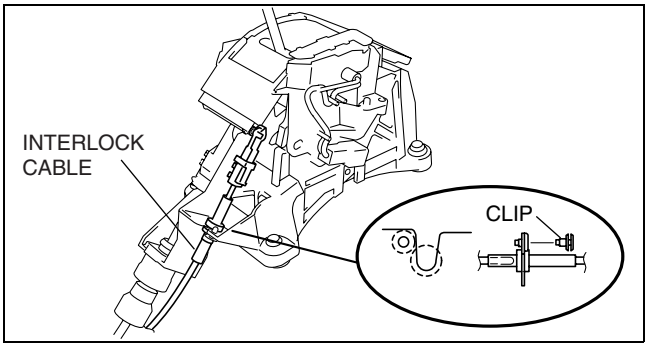
10. Rotate the slider pin to release the lock and verify that it slides freely.

11. Pull the slider pin outward until it contacts the brake pedal stopper rubber and rotate the slider pin to lock.
12. Verify that the selector lever in the P position.




acxuuw00000428

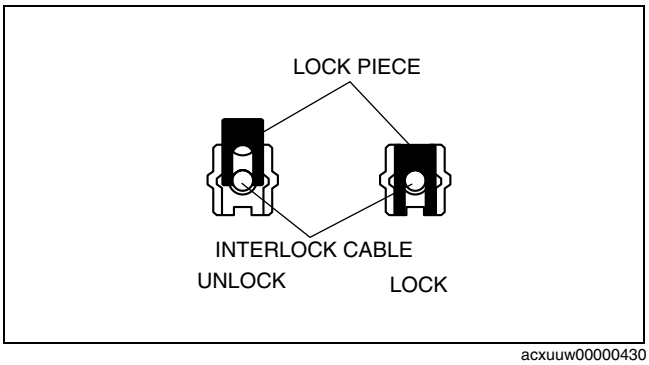
13. Install the interlock cable end to the cam pin on the selector lever.
14. Fit the interlock cable in the U–groove in the selector lever base plate and install the clip.




acxuuw00000429

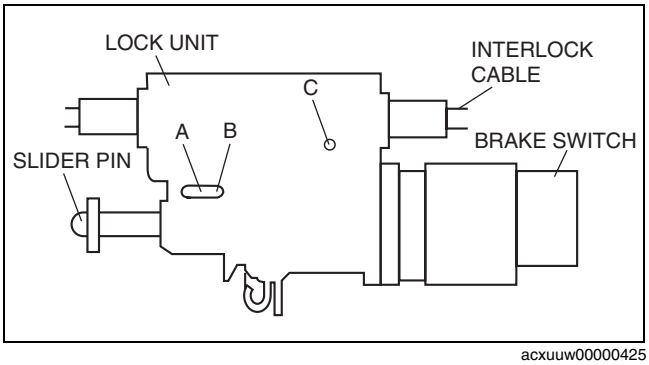
15. Press the interlock cable lock piece in until it is locked.

**Caution**
- **Applying a load to the interlock cable while pressing the lock piece in can affect the lock unit operation.**




acxuuw00000430

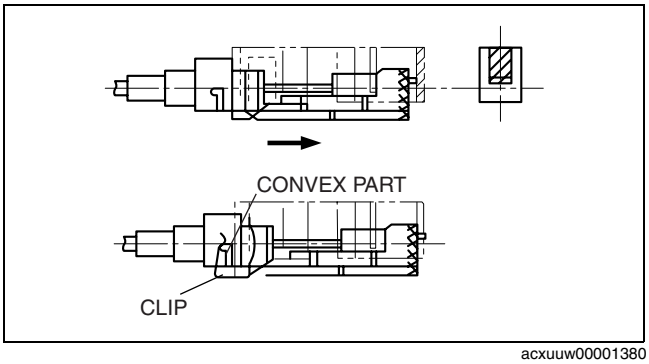
16. Remove the a 1.5mm {0.059 in} round bar or similar from the lock unit holes A, B, and C.
17. Connect the brake switch connector with the brake pedal released.




acxuuw00000425

**Caution**
- **The clearance between the brake switch and the brake pedal is automatically adjusted to the correct amount when the brake switch connector is connected after the brake switch has been properly installed. If the brake switch is not properly installed or the connector is connected before installation, the clearance may be incorrect, causing a brake light malfunction. Therefore, always verify that the brake switch is properly installed before connecting the connector.**
- **Once the brake switch clearance has automatically been adjusted, it cannot be adjusted again. Therefore, replace the switch with a new one when replacing the power brake unit or the pedal, or performing any procedure that changes the pedal stroke.**

18. Turn the ignition switch to ON position.
19. Install the interlock cable to the steering lock.
20. Slide the outer casing to the steering lock and insert the clip over the convex part of the outer casing.




acxuuw00001380

# 05-50 TECHNICAL DATA

**TRANSMISSION/TRANSAXLE**
**TECHNICAL DATA . . . . . 05-50–1**

## TRANSMISSION/TRANSAXLE TECHNICAL DATA

id055000800100

| Item | Specification |
|---|---|
| Average time lag | N position → D range: 1.5 s or less<br>N position → R position: 1.5 s or less |
| ATF | Type: JWS3309<br>Capacity (Approx. quantity): 7.0 L {7.4 US qt, 6.2 lmp qt} |
| Distance A ((between the end of the torque converter and the end of the converter housing)) | 31.4 mm {1.24 in} |



**Line pressure**

| Position/range | | Line pressure (kPa {kgf/cm$^2$, psi}) |
|---|---|---|
| D, M | Idle | 350—410 {3.6—4.1, 51—59} |
| R | Idle | 580—670 {6.0—6.8, 85—97} |

**Engine stall speed**

| Position/range | Engine stall speed (rpm) |
|---|---|
| D, M | 2,800 |
| R | |

**Transaxle fluid temperature (TFT) sensor**

| ATF temperature (°C {°F}) | Resistance (kilohm) |
|---|---|
| 10 {50} | 5.62—7.31 |
| 25 {77} | Approx. 3.5 |
| 110 {230} | 0.22—0.27 |

**Input/turbine speed sensor**

| Signal | Current (mA) |
|---|---|
| High | 12.0—16.0 |
| Low | 4.0—8.0 |

**VSS**

| Signal | Current (mA) |
|---|---|
| High | 12.0—16.0 |
| Low | 4.0—8.0 |

**Solenoid valve resistance (ATF temperature: 20 C {68 F})**

| Terminal | Solenoid valve | Resistance (ohm) |
|---|---|---|
| B5—GND | Shift solenoid A | 11—15 |
| B2—GND | Shift solenoid B | 11—15 |
| B11—B10 | Shift solenoid C | 5.0—5.6 |
| B17—B18 | Shift solenoid D | 5.0—5.6 |
| B14—B22 | Shift solenoid E | 5.0—5.6 |
| B21—B16 | Shift solenoid F | 5.0—5.6 |
| B9—B4 | TCC control solenoid | 5.0—5.6 |
| B3—B1 | Line pressure control solenoid | 5.0—5.6 |

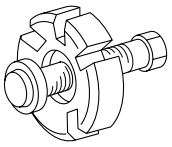
# 05-60 SERVICE TOOLS

**TRANSMISSION/TRANSAXLE SST. . . . 05-60–1**

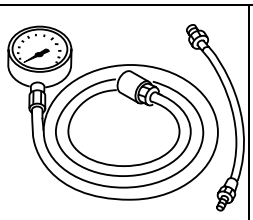
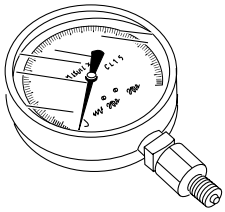
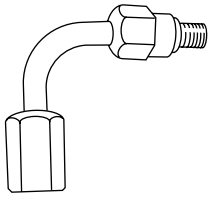
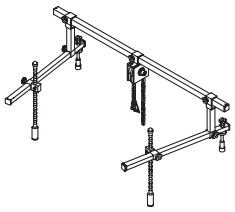
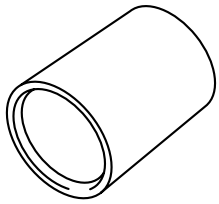
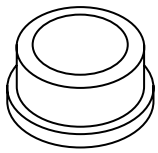
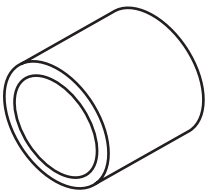
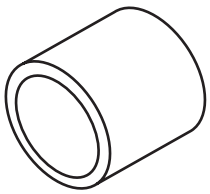
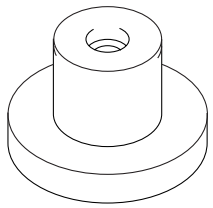
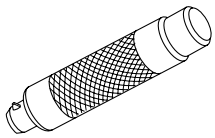
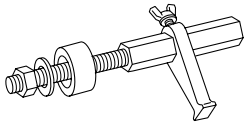
## TRANSMISSION/TRANSAXLE SST

id056000500100

1: Mazda SST number
2: Global SST number
**Example**

| | |
|---|---|
| 1:49 UN30 3009<br>2:303-009<br><br>Crankshaft damper remover |  |



| | | |
|---|---|---|
| 1:49 0378 400C<br>2: –<br><br>Oil pressure gauge set<br>  | 1:49 B019 901B<br>2: –<br><br>Oil pressure gauge<br>  | 1:49 HD64 406A<br>2: –<br><br>Adapter<br>  |
| 1:49 C017 5A0*<br>2: –<br><br>Engine support<br>  | 1:49 H028 202<br>2: –<br><br>Block L<br>  | 1:49 F027 009<br>2: –<br><br>Attachment for 68&77 (Part of 49 F027 0A1)<br>  |
| 1:49 L033 101<br>2: –<br><br>Oil seal installer<br>  | 1:49 U027 003<br>2: –<br><br>Oil seal installer<br>  | 1:49 F026 102<br>2: –<br><br>Bearing replacer<br>  |
| 1:49 G030 797<br>2: –<br><br>Handle<br>  | 1:49 E011 1A0<br>2: –<br><br>Ring gear brake set<br>  | – |

* : The SST (49 E017 5A0) can be used in place of the SST (49 C017 5A0).

# STEERING

# 06
SECTION


GENERAL PROCEDURES . . . . 06-10
POWER STEERING . . . . . 06-14
TECHNICAL DATA . . . . . 06-50
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# 06-10 GENERAL PROCEDURES


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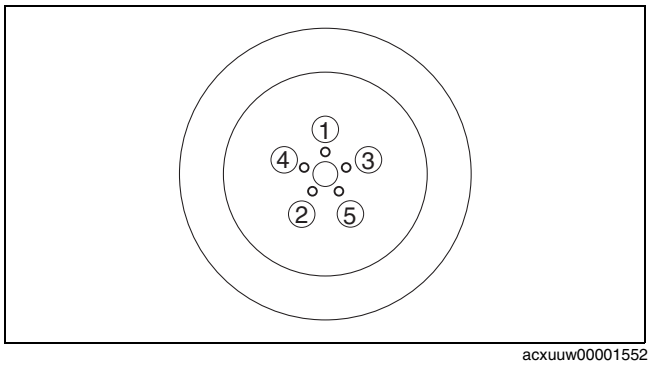
## GENERAL PROCEDURES (STEERING)

id061000800100

### Wheel and Tire Installation

1. When installing the wheels and tires, tighten the wheel nuts in a criss-cross pattern to the following tightening torque.

   **Tightening torque**
   **88.2— 117.6 N·m {9.00— 11.99 kgf·m, 65.06— 86.73 ft·lbf}**

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### Power Steering Components Removal/Installation

1. If any power steering fluid line has been disconnected anytime during the procedure, add ATF M-III, M-V or equivalent (e.g. Dexron®II), bleed the fluid lines, and inspect for leakage after the procedure has been completed.

### Connector Disconnection

1. Disconnect the negative battery cable before performing any work that requires handling of connectors. (See 01-17-2 BATTERY REMOVAL/INSTALLATION[L3 WITH TC])

### Suspension Arm Removal/Installation

1. Tighten any part of the suspension that uses rubber bushings only after vehicle has been lowered to the ground and unloaded.

   **Note**
   - Unloaded: Fuel tank is full. Engine coolant and engine oil are at specified level. Spare tire, jack, and tools are in designated position.

# 06-14 POWER STEERING

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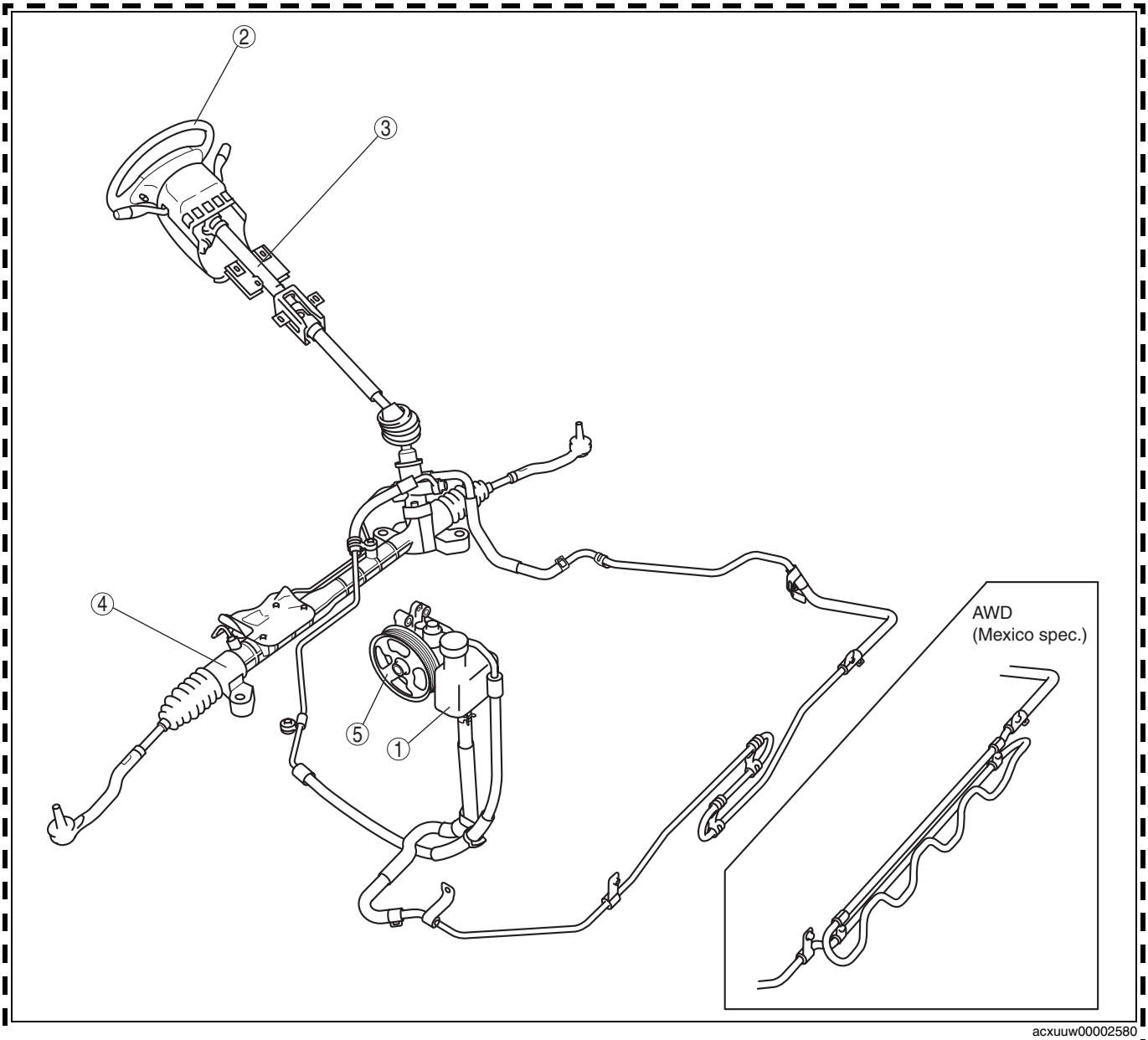


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| | |
|---|---|
| 1 | Power steering fluid<br>(See 06-14-3 AIR BLEEDING.)<br>(See 06-14-3 POWER STEERING FLUID INSPECTION.) |
| 2 | Steering wheel and column<br>(See 06-14-5 STEERING WHEEL AND COLUMN INSPECTION.)<br>(See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) |
| 3 | Steering shaft<br>(See 06-14-8 STEERING SHAFT INSPECTION.) |
| 4 | Steering gear and linkage<br>(See 06-14-9 STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION.)<br>(See 06-14-10 STEERING GEAR AND LINKAGE DISASSEMBLY.)<br>(See 06-14-13 STEERING GEAR AND LINKAGE INSPECTION.)<br>(See 06-14-14 STEERING GEAR AND LINKAGE ASSEMBLY.) |
| 5 | Power steering oil pump<br>(See 06-14-21 POWER STEERING OIL PUMP REMOVAL/INSTALLATION.)<br>(See 06-14-22 POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY.) |

## AIR BLEEDING

id061400800200

**Caution**
- **Do not turn the steering wheel during the fluid level inspection, otherwise the fluid level changes and cannot be inspected correctly.**

1. Inspect the fluid level. (See 06-14-3 POWER STEERING FLUID INSPECTION.)
2. Jack up the front of the vehicle and support it on safety stands.
3. Turn the steering wheel fully to the left and right several times with the engine not running.
4. Reinspect the fluid level.
   - If it has dropped, add fluid.
5. Repeat Steps 3 and 4 until the fluid level stabilizes.
6. Lower the vehicle.
7. Start the engine and let it idle.
8. Turn the steering wheel fully to the left and right several times.
9. Verify that the fluid is not foamy and that the fluid level has not dropped.
   - If the fluid level has dropped, add fluid as necessary and repeat Steps 8 and 9.

## POWER STEERING FLUID INSPECTION

id061400800500



### Fluid Level Inspection

1. Inspect the power steering fluid level.
   - Add fluid to the specified level as necessary.

**Power steering fluid type**

**ATF M-III, M-V or equivalent (e.g. Dexron®II)**

**Power steering fluid capacity (approx. quantity)**

**2WD, AWD (except Mexico spec.): 0.89 L {0.94 US qt, 0.78 Imp qt}**
**AWD (Mexico spec.): 0.98 L {1.0 US qt, 0.86 Imp qt}**

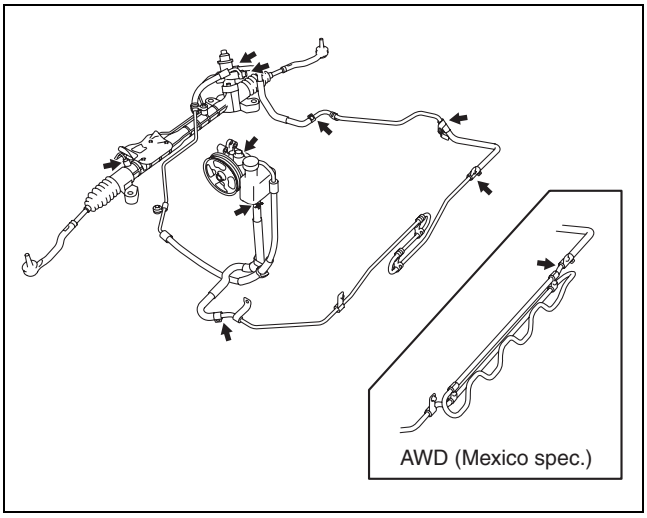
### Fluid Leakage Inspection

1. Start the engine and let it idle.
2. Turn the steering wheel fully to the left and right to apply fluid pressure.

**Caution**
- **If the steering wheel is kept in the fully turned position for more than 5, the fluid temperature will rise excessively and adversely affect the oil pump.**

3. Inspect for fluid leakage.
   - If fluid leakage is found, replace related pipe or hose.

**Note**
- The points where fluid leakage may occur are indicated in the figure.

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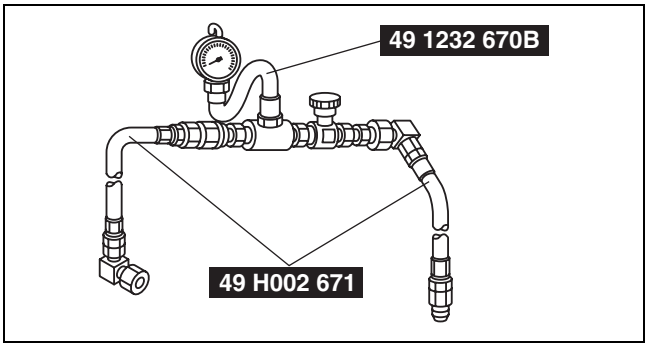
**Fluid Pressure Inspection**

1. Assemble the **SSTs** as shown in the figure.



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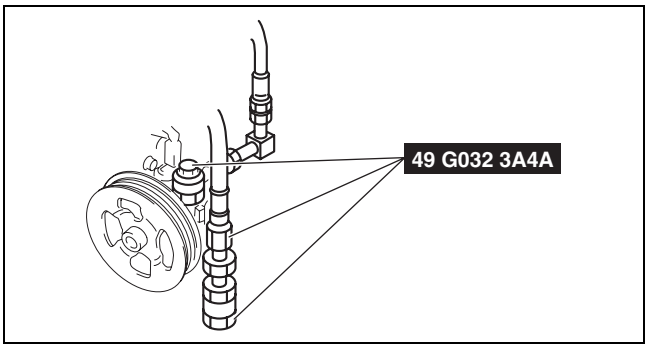
2. Disconnect the pressure pipe from the oil pump, and connect the **SSTs.**

   **Tightening torque**
   **29.4— 44.1 N·m {3.0— 4.4 kgf·m, 22— 32 ft·lbf}**



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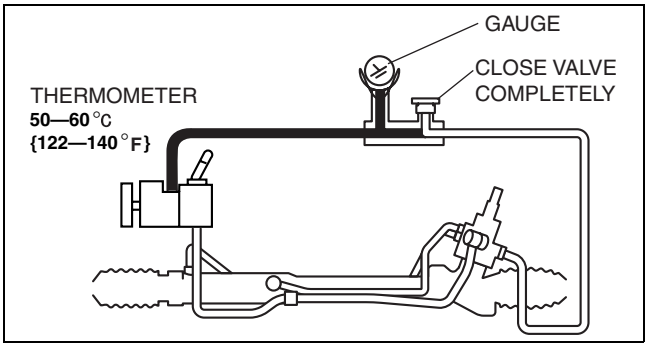
3. Bleed the air from the system. (See 06-14-3 AIR BLEEDING.)
4. Open the gauge valve fully.
5. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50— 60 °C {122— 140 °F}.**
6. Close the gauge valve completely.
7. Increase the engine speed to **1,000— 1,500 rpm** and measure the fluid pressure generated by the oil pump.
   - If the pressure is not within the specification, repair or replace the oil pump component.



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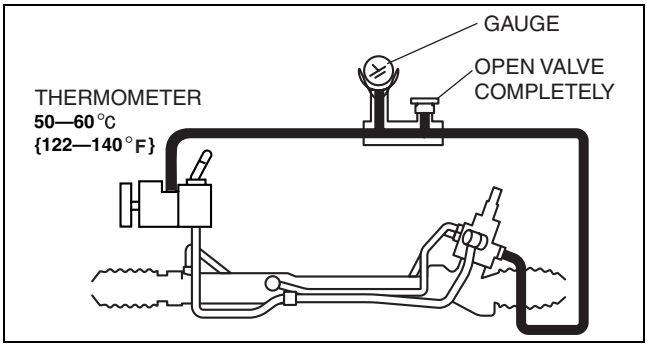
   **Caution**
   - **If the valve is left closed for more than 5, the fluid temperature will rise excessively and adversely affect the oil pump.**

   **Oil pump fluid pressure**
   **10.31— 10.80 MPa {105.2— 110.1 kgf/cm$^2$, 1,496— 1,566 psi}**

8. Open the gauge valve fully and increase the engine speed to**1,000— 1,500 rpm.**
9. Turn the steering wheel fully to the left and right, then measure the fluid pressure generated at the gear housing.
   - If the pressure is not within the specification, repair or replace the steering gear component.



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   **Caution**
   - **If the steering wheel is kept in the fully turned position for more than 5 seconds, the fluid temperature will rise excessively and adversely affect the oil pump.**

   **Gear housing fluid pressure**
   **10.31— 10.80 MPa {105.2— 110.1 kgf/cm$^2$, 1,496— 1,566 psi}**

10. Remove the **SSTs.** Install and tighten the pressure pipe to the specified torque.

**Tightening torque**
**29.4— 44.1 N·m {3.0— 4.4 kgf·m, 22— 32 ft·lbf}**

11. Bleed the air from the system.

## STEERING WHEEL AND COLUMN INSPECTION

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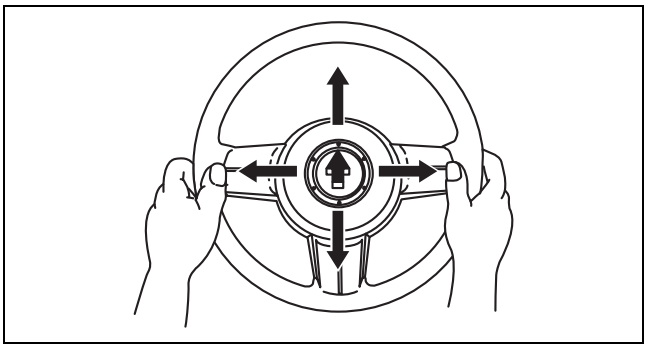
### Steering Wheel Play Inspection

1. With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and verify that the play is within the specification.
   - If the play exceeds the specification, either the steering joints are worn or the backlash of the steering gear is excessive. Correct as necessary.

**Steering wheel play**
**0— 30 mm {0— 1.18 in}**

### Steering Wheel Looseness Inspection

1. Move the steering wheel as shown in the figure to inspect for column bearing wear, steering shaft joint play, steering wheel looseness, and column looseness.
   - Repair or replace as necessary.



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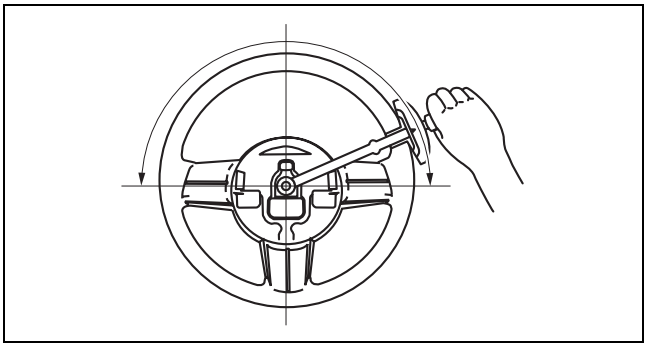
### Steering Wheel Effort Inspection

1. Inspect the following points:
   - Tire size and tire pressure
   - Fluid level
   - Drive belt deflection
2. With the vehicle on a hard, level surface, put the wheels in the straight-ahead position.
3. Remove the air bag module.

**Warning**
- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

4. Start the engine and warm the power steering fluid to **50— 60 °C {122— 140 °F}.**
5. Measure the steering wheel effort using a torque wrench.
   - If not within the specification, verify the following:
     — No air in steering system
     — No fluid leakage at hose or connectors
     — Function of oil pump and steering gear

**Steering wheel effort (reference value)**
**7.8 N·m {80 kgf·cm, 69 in·lbf} max.**



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**Note**
- To determine whether the steering effort is satisfactory or not, perform the inspection on another vehicle of the same model and under the same conditions, and compare the results.
- The steering wheel effort varies with conditions as shown below.
  — Road conditions, such as dry or wet, and asphalt or concrete.
  — Tire conditions, such as brand, wear, and tire pressure.

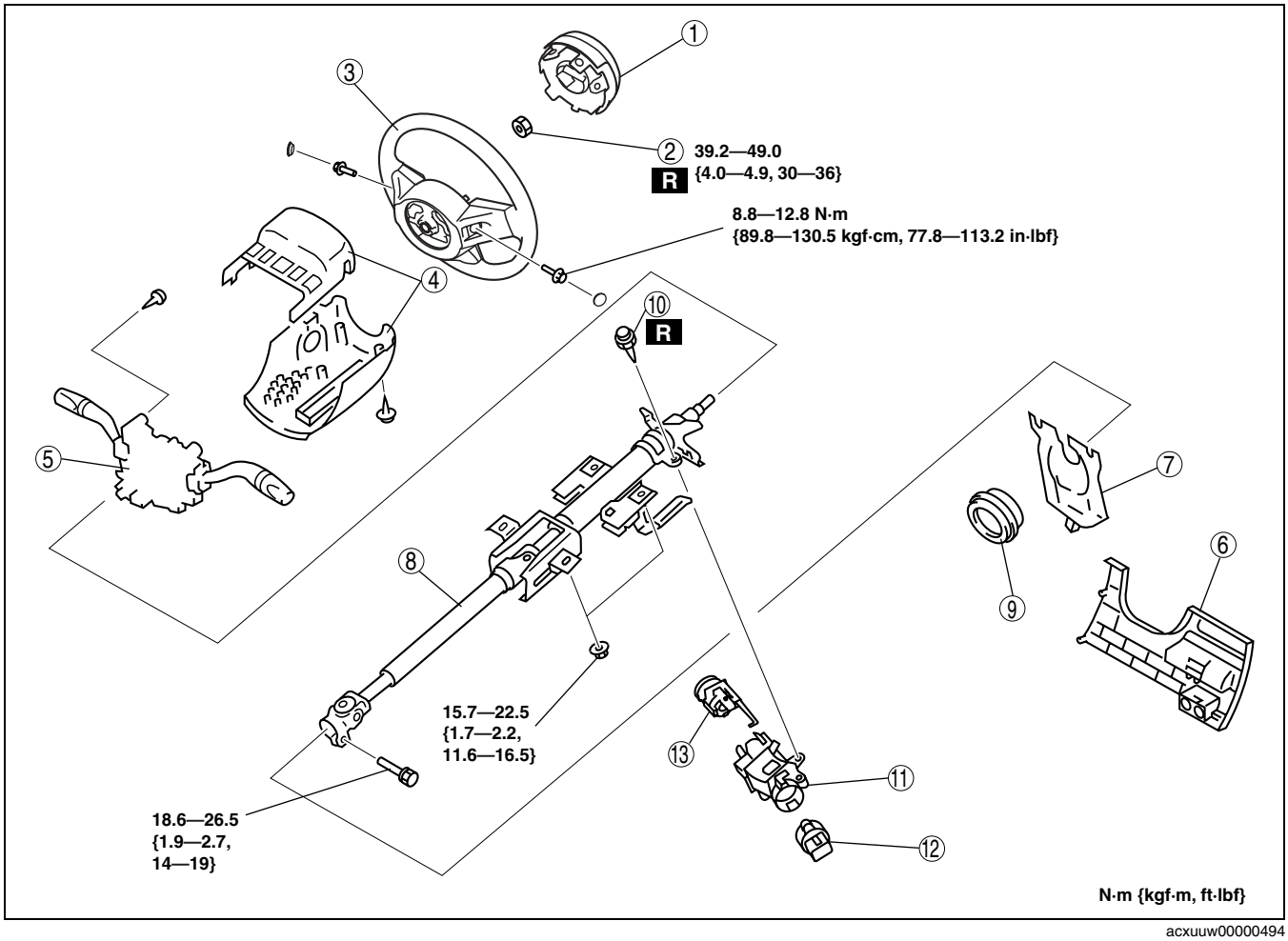
## STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION

id061400800400

**Warning**

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read AIR BAG SYSTEM WARNINGS before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.
3. If the steering lock component of a vehicle equipped with the advanced keyless system is replaced, perform the following procedure after installation.
   - Without immobilizer system
     — Steering lock unit programming (See 09-14-35 STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].)
   - With immobilizer system
     — Immobilizer system resetting (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)

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| | |
|---|---|
| 1 | Air bag module<br>(See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 2 | Locknut |
| 3 | Steering wheel<br>(See 06-14-7 Steering Wheel Removal Note.)<br>(See 06-14-8 Steering Wheel Installation Note.) |

| | |
|---|---|
| 4 | Column cover<br>(See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.) |
| 5 | Combination switch<br>(See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.) |
| 6 | Lower panel<br>(See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.) |

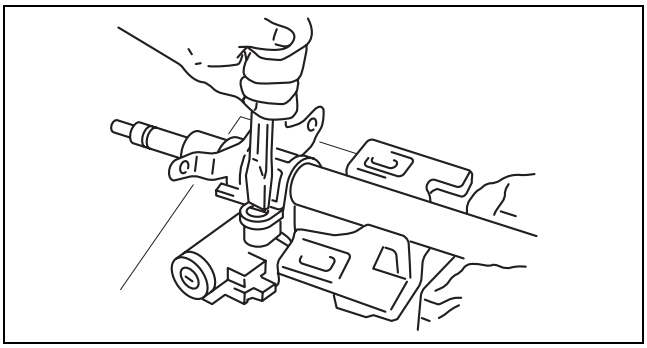
| | |
|---|---|
| 7 | Joint cover |
| 8 | Steering shaft<br>(See 06-14-8 Steering Shaft Installation Note.) |
| 9 | Dust cover |
| 10 | Steering lock mounting bolts<br>(See 06-14-7 Steering Lock Mounting Bolts Removal Note.)<br>(See 06-14-7 Steering Lock Mounting Bolts Installation Note.) |
| 11 | Steering lock component |
| 12 | Ignition switch<br>(See 09-21-2 IGNITION SWITCH REMOVAL/ INSTALLATION.) |
| 13 | Key cylinder (Without advanced keyless system)<br>(See06-14-7 Key Cylinder (Without Advanced Keyless System) Removal Note.) |

**Steering Wheel Removal Note**

**Caution**
- **Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.**

1. Set the vehicle in the straight-ahead position.
2. Remove the steering wheel using a suitable puller.

**Steering Lock Mounting Bolts Removal Note**
1. Make a groove in the heads of the steering lock mounting bolts using a chisel and a hammer.
2. Remove the bolts using a screwdriver.
3. Disassemble the steering lock component.



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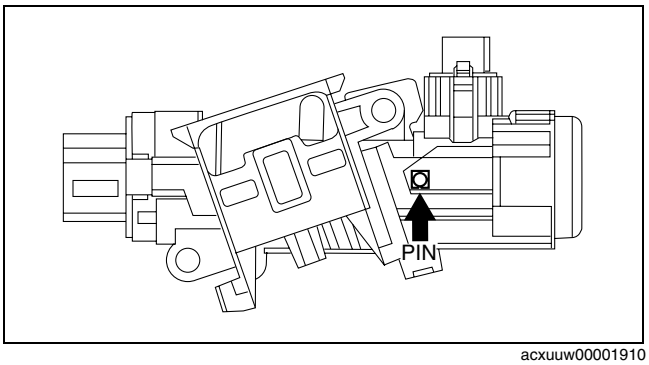
**Key Cylinder (Without Advanced Keyless System) Removal Note**
1. Turn the key to the ACC position.
2. Push the pin and remove the outer cylinder.

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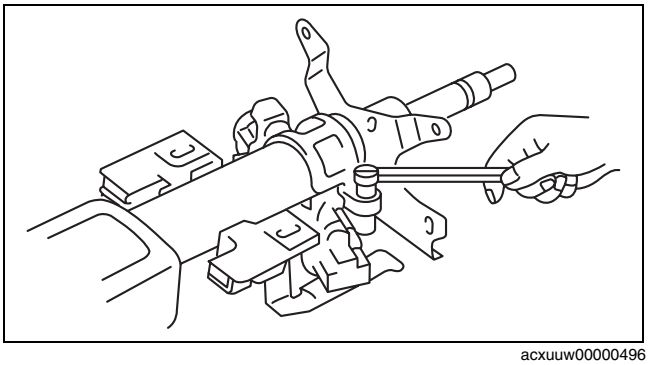
**Steering Lock Mounting Bolts Installation Note**
1. Assemble the steering lock component to the steering shaft.
2. Verify that the lock operates correctly.
3. Install new steering lock mounting bolts.
4. Tighten the bolts until the heads break off.



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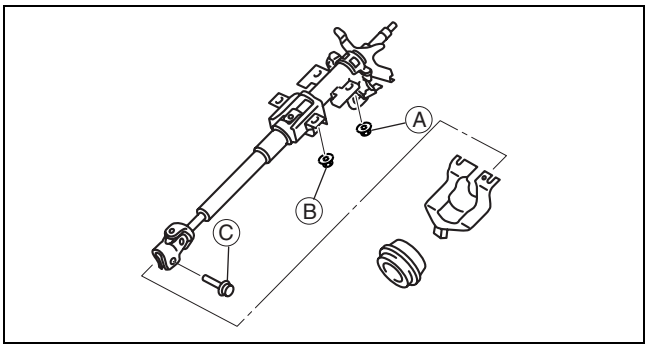
**Steering Shaft Installation Note**

**Caution**
- **Do not apply a shock in the axial direction of the shaft.**

1. Lock the tilt lever.
2. Tighten nut A.
3. Tighten nut B.
4. Tighten bolt C.

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**Steering Wheel Installation Note**

1. Make sure the wheels in the straight-ahead position, and install the steering wheel.

**STEERING SHAFT INSPECTION**

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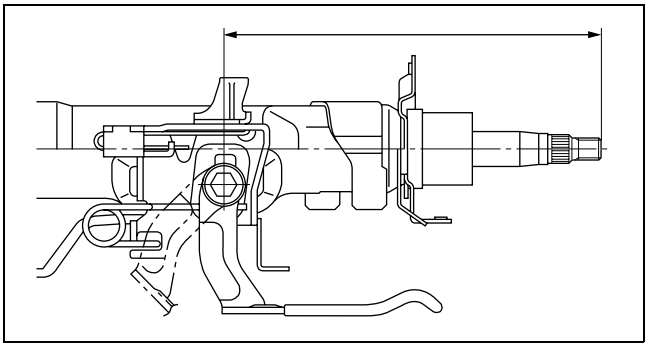
1. Inspect the following.
   (1) Column bearing for damage
   (2) Steering shaft length
      - Replace the steering shaft component as necessary.

**Steering shaft length**
**211.6 mm {8.3 in}**



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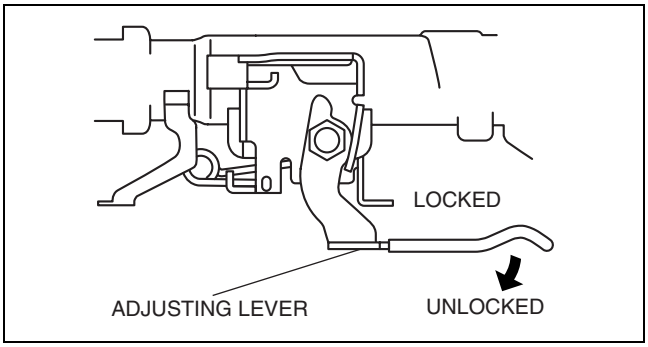
2. Inspect the tilt and telescope operation.
   (1) Verify that the adjusting lever moves smoothly from unlock position to lock position.
   (2) Verify that the steering shaft is fixed firmly when the adjusting lever is locked.
      - Replace the steering shaft component as necessary.

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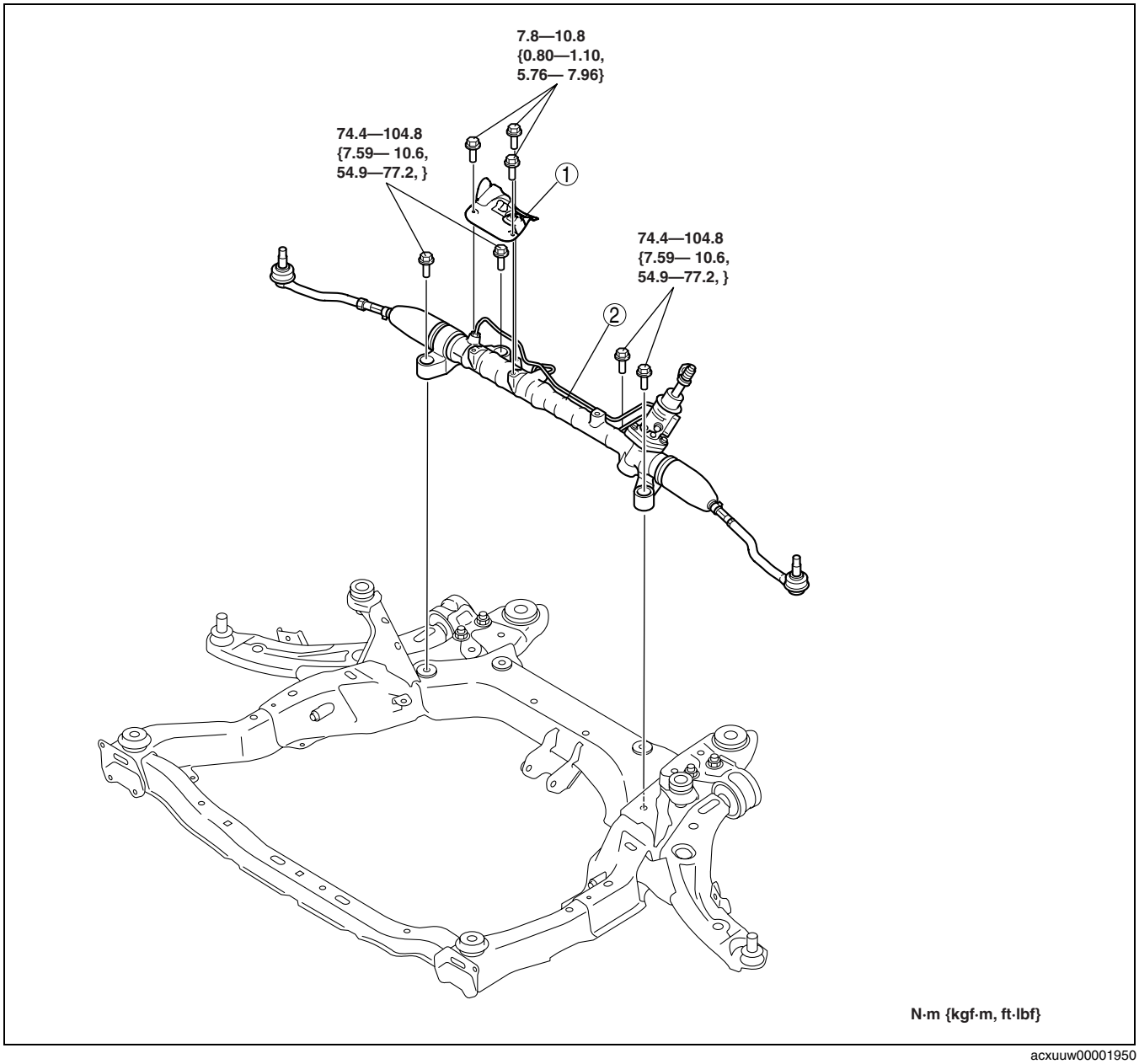
## STEERING GEAR AND LINKAGE REMOVAL/INSTALLATION

id061400800900

**Caution**

- **Performing the following procedures without first removing the ABS wheel-speed sensor may possibly cause an open circuit in the wiring harness if it is pulled by mistake. Before performing the following procedures, disconnect the ABS wheel-speed sensor connector (axle side) and fix the wiring harness to an appropriate place where it will not be pulled by mistake while servicing the vehicle.**

1. Remove the transverse member. (See 02-13-14 TRANSVERSE MEMBER REMOVAL/INSTALLATION.)
2. Remove the front crossmember, lower arm, front stabilizer, and steering gear and linkage as a single unit. (See 02-13-10 FRONT CROSSMEMBER REMOVAL/INSTALLATION.)
3. Remove the front stabilizer from the crossmember component. (See 02-13-8 FRONT STABILIZER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.
5. Install in the reverse order of removal.
6. After installation, inspect the front wheel alignment and adjust it if necessary. (See 02-11-2 FRONT WHEEL ALIGNMENT.)

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| | | | |
|---|---|---|---|
| 1 | Insulator | 2 | Steering gear and linkage |

## STEERING GEAR AND LINKAGE DISASSEMBLY

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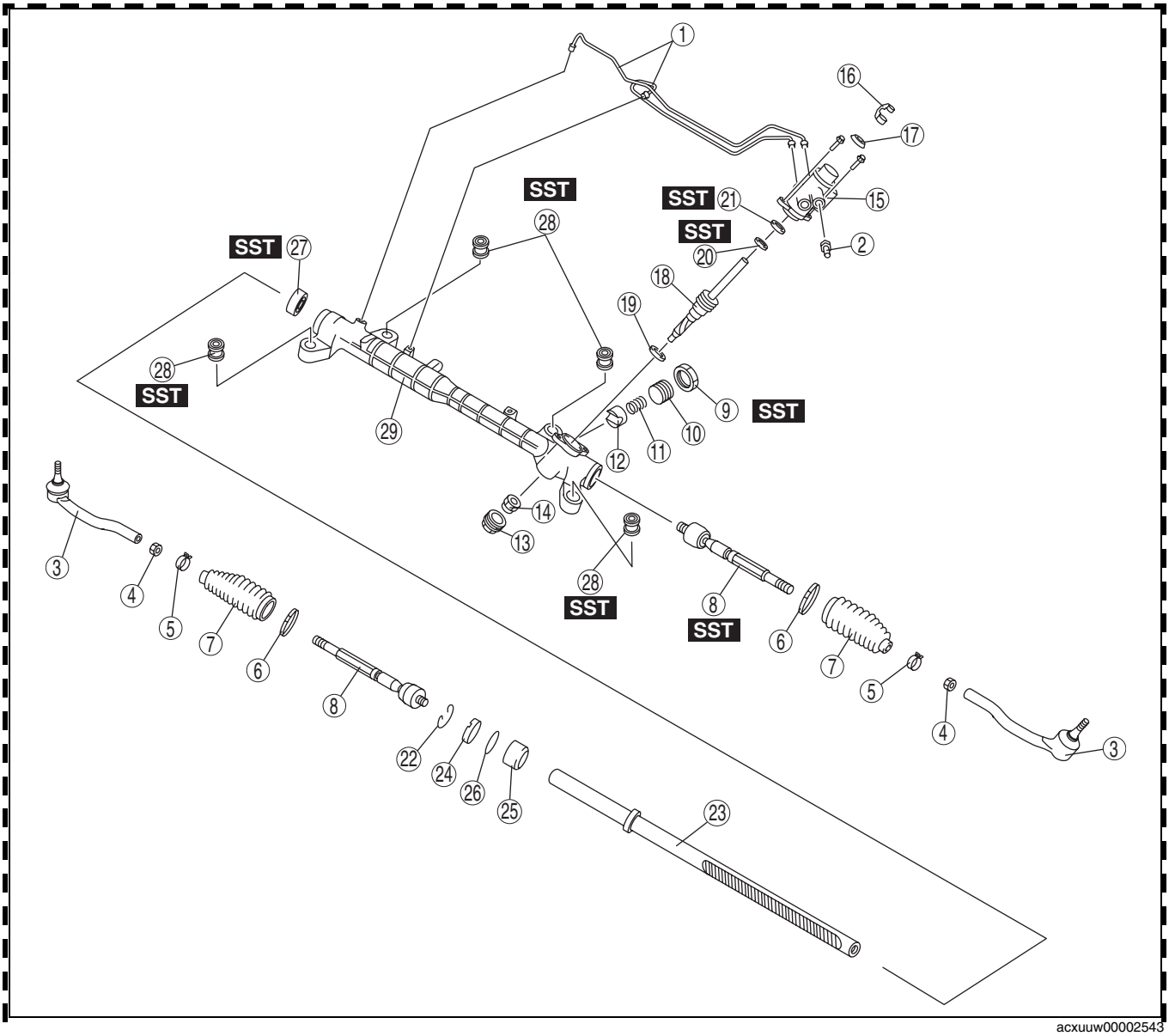
**Caution**

- **Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.**

1. Disassemble in the order indicated in the table

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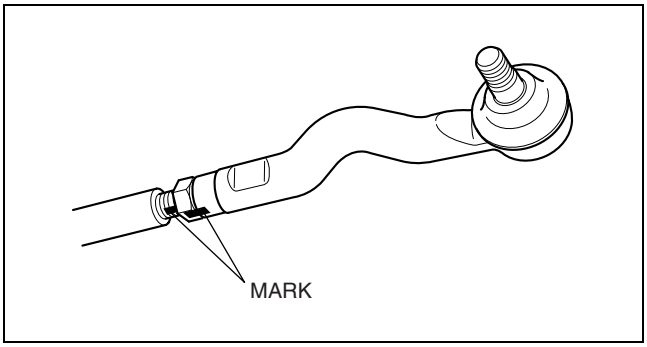
| | |
|---|---|
| 1 | Oil pipe |
| 2 | Return pipe |
| 3 | Tie-rod End<br>(See 06-14-11 Tie-rod End Disassembly Note.) |
| 4 | Locknut |
| 5 | Boot clamp |
| 6 | Boot band |
| 7 | Boot |
| 8 | Tie-rod<br>(See 06-14-11 Tie-rod Disassembly Note.) |
| 9 | Locknut (adjusting cover)<br>(See 06-14-12 Locknut (Adjusting Cover), Adjusting Cover Disassembly Note.) |

| | |
|---|---|
| 10 | Adjusting cover<br>(See 06-14-12 Locknut (Adjusting Cover), Adjusting Cover Disassembly Note.) |
| 11 | Yoke spring |
| 12 | Support yoke |
| 13 | Housing cover |
| 14 | Locknut (pinion shaft side) |
| 15 | Pinion shaft and valve housing component |
| 16 | Clip |
| 17 | Dust cover |

| | |
|---|---|
| 18 | Pinion shaft<br>(See 06-14-12 Pinion Shaft, Oil seal (lower side) Disassembly Note.) |
| 19 | Oil seal (lower side)<br>(See06-14-12 Pinion Shaft, Oil seal (lower side) Disassembly Note .) |
| 20 | Bearing (upper side)<br>(See 06-14-12 Bearing (upper side), Oil seal (upper side) Disassembly Note.) |
| 21 | Oil seal (upper side)<br>(See 06-14-12 Bearing (upper side), Oil seal (upper side) Disassembly Note.) |
| 22 | Clip<br>(See 06-14-13 Clip Disassembly Note.) |
| 23 | Steering rack |
| 24 | Stopper |
| 25 | Rack bushing |
| 26 | O-ring |
| 27 | Oil seal<br>(See 06-14-13 Oil Seal Disassembly Note.) |
| 28 | Mounting rubber<br>(See 06-14-13 Mounting Rubber Disassembly Note.) |
| 29 | Gear housing |

**Tie-rod End Disassembly Note**

1. Place alignment marks as shown in the figure for proper installation.

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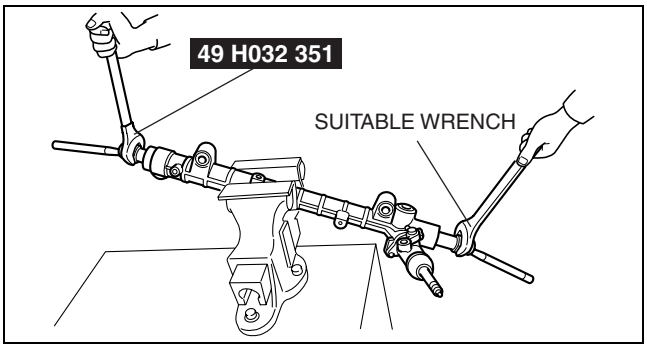
**Tie-rod Disassembly Note**

1. Lock the steering rack end (pinion gear side) against rotation with a wrench remove the tie rod using the **SST**.
   **Substitution SST**
   - **49 H032 351**
     Width across flats 34mm {1.3 in} (Torque control enabled wrench)

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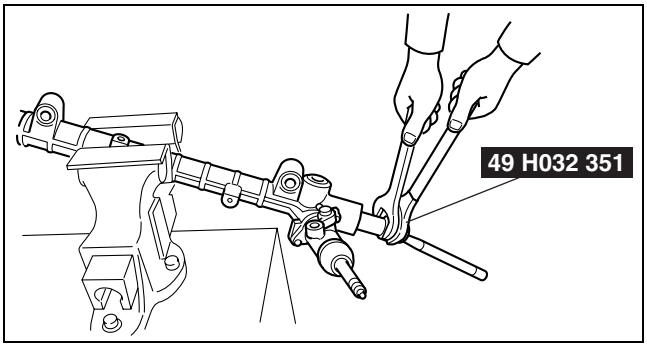
2. Install a wrench to the tie rod end and the flat surface of the steering rack as shown in the figure and remove the inner ball joint using the **SST**.

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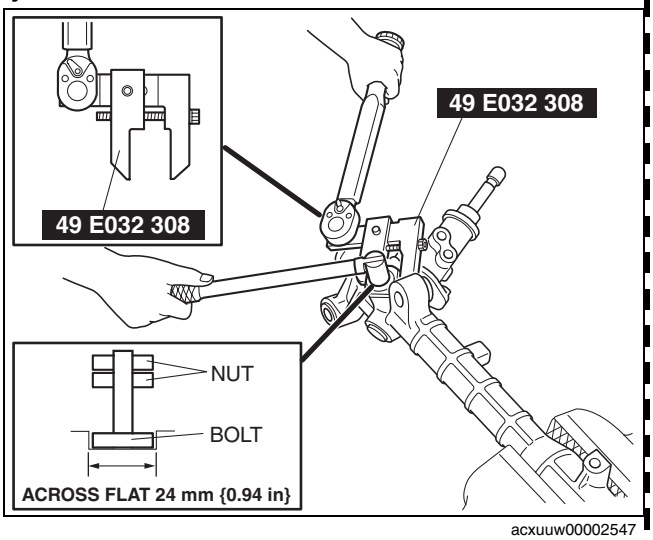
**Locknut (Adjusting Cover), Adjusting Cover Disassembly Note**

1. Install two nuts to the bolt across a flat **24 mm {0.94 in}** and tighten them using a wrench.
2. Secure the adjusting cover with the bolt and nuts created in Step 1, and remove the locknut using the **SST**.

**Caution**

- **If a tool such as a torque wrench is installed to the SST (49 E032 308), install the tool so that it is perpendicular to the SST as shown in the figure. If the tool is not installed as instructed, the SST can separate from the locknut easily which could cause damage to the locknut while doing the work.**

3. Using the bolt/nut produced in Step 1, remove the adjusting cover.

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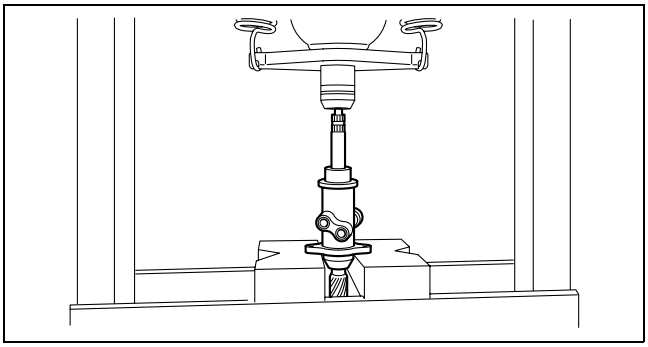
**Pinion Shaft, Oil seal (lower side) Disassembly Note**

1. Press out the pinion shaft and oil seal (lower side) component.



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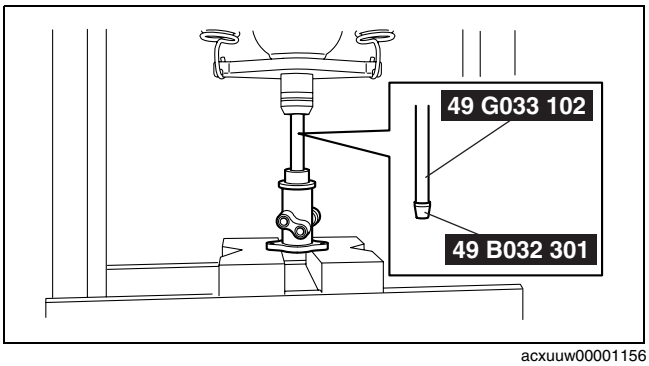
**Bearing (upper side), Oil seal (upper side) Disassembly Note**

1. Press out the upper bearing and oil seal from the valve housing using the **SSTs**.
   **Substitution SST**
   - **49 G033 102**
     Outer diameter: 23— 24 mm {0.91— 0.94 in}

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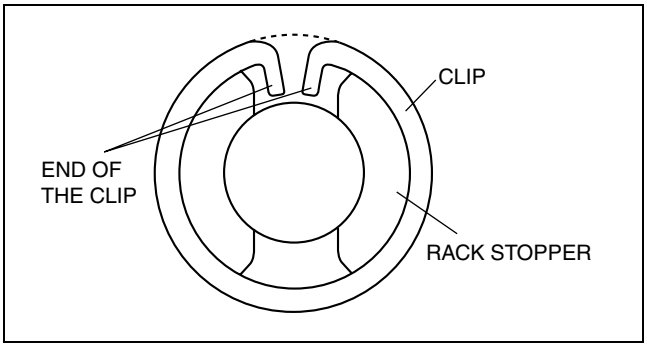
**Clip Disassembly Note**

1. Remove the clip while pinching both ends of the clip using long-nose pliers as shown in the figure.
2. Using a snap ring plier, withdraw the rack stopper.

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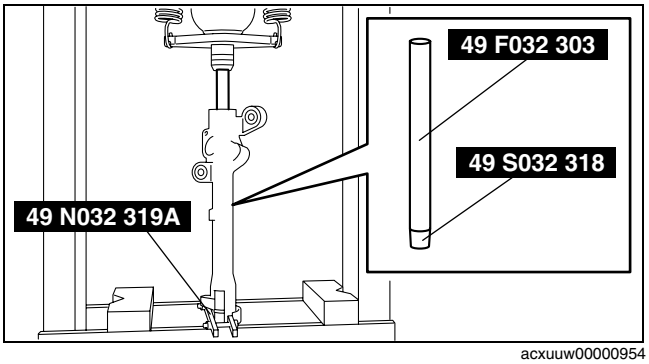
**Oil Seal Disassembly Note**

1. Install the **SST** (49 N032 319A) to the gear housing with the raised part facing up as shown in the figure.
2. Insert the **SSTs** (49 F032 303, 49 S032 318) into the valve housing side.
3. Remove the oil seal using a press.

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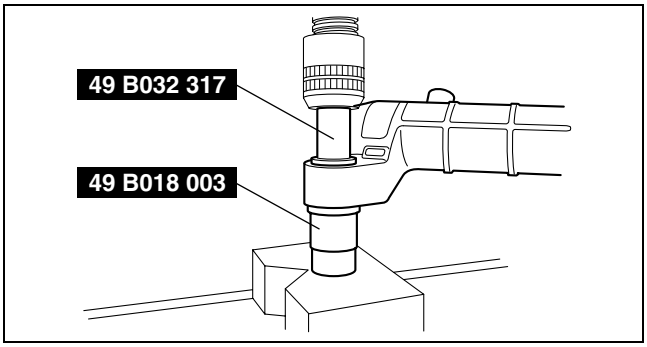
**Mounting Rubber Disassembly Note**

1. Press the mounting rubber out from the gear housing using the **SSTs** and a press.
   **Substitution SST**
   - **49 B018 003**
     Outer diameter: 36— 38 mm {1.42— 1.49 in}
   - **49 B032 317**
     Outer diameter: 35mm {1.4 in} or more

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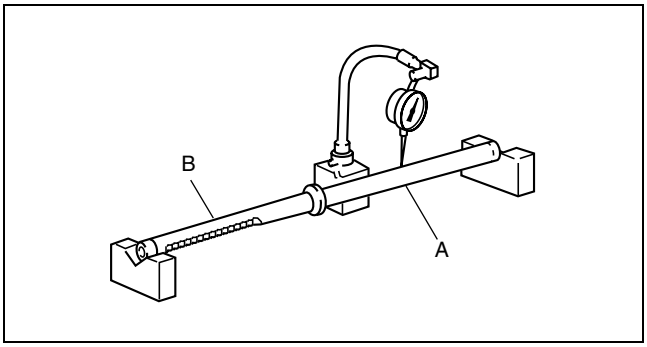
**STEERING GEAR AND LINKAGE INSPECTION**

id061400801100

**Steering Rack Inspection**

1. Inspect for cracking, damage, and tooth wear.
   - If there is any malfunction, replace the steering rack.
2. Measure the steering rack warp.
   - If it exceeds the maximum specification, replace the steering rack.

   **Steering rack runout**
   **Large diameter portion (near point A): 0.15 mm {0.006 in} max.**
   **Small diameter portion (near point B): 0.20 mm {0.008 in} max.**

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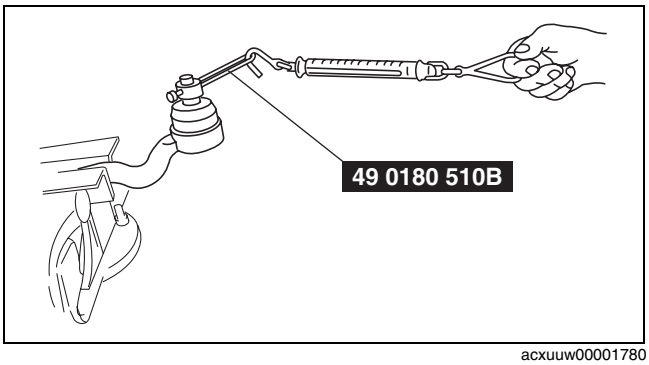
**Tie-rod End Inspection**

1. Inspect the tie-rod end for damage and boot cracks. Replace it if necessary.
2. Inspect the ball joint for looseness. Replace the tie-rod end if necessary.
3. Rotate the ball joint five times.
4. Measure the rotation torque of the ball joint using the **SST** and a pull scale.

**Rotation torque**
**0.5— 3.0 N·m {0.06— 30 kgf·cm, 5— 26 in·lbf}**
**Pull scale reading**
**5— 30 N {0.6— 3.0 kgf, 3.7— 22 lbf}**

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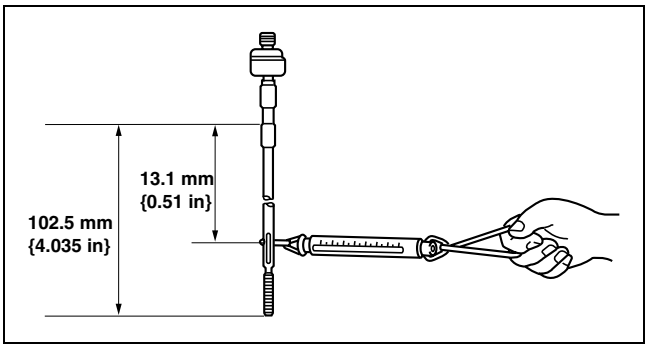
**Tie rod Inspection**

1. Inspect for bending and damage.
   - If there is any malfunction, replace the tie rod.
2. Inspect for excessive play.
   - If there is any malfunction, replace the tie rod.
3. Swing the ball joint **10 times.**
4. Measure the ball joint swing torque using a pull scale.
   - If it exceeds the specification, replace the tie rod.

**Tie rod swing torque**
**0.4— 4.0 N·m {5— 40 kgf·cm, 4— 35 in·lbf}**
**[Pull scale reading 4.2— 41.6 N {0.43— 4.24 kgf, 0.95— 9.35 lbf}]**

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**STEERING GEAR AND LINKAGE ASSEMBLY**

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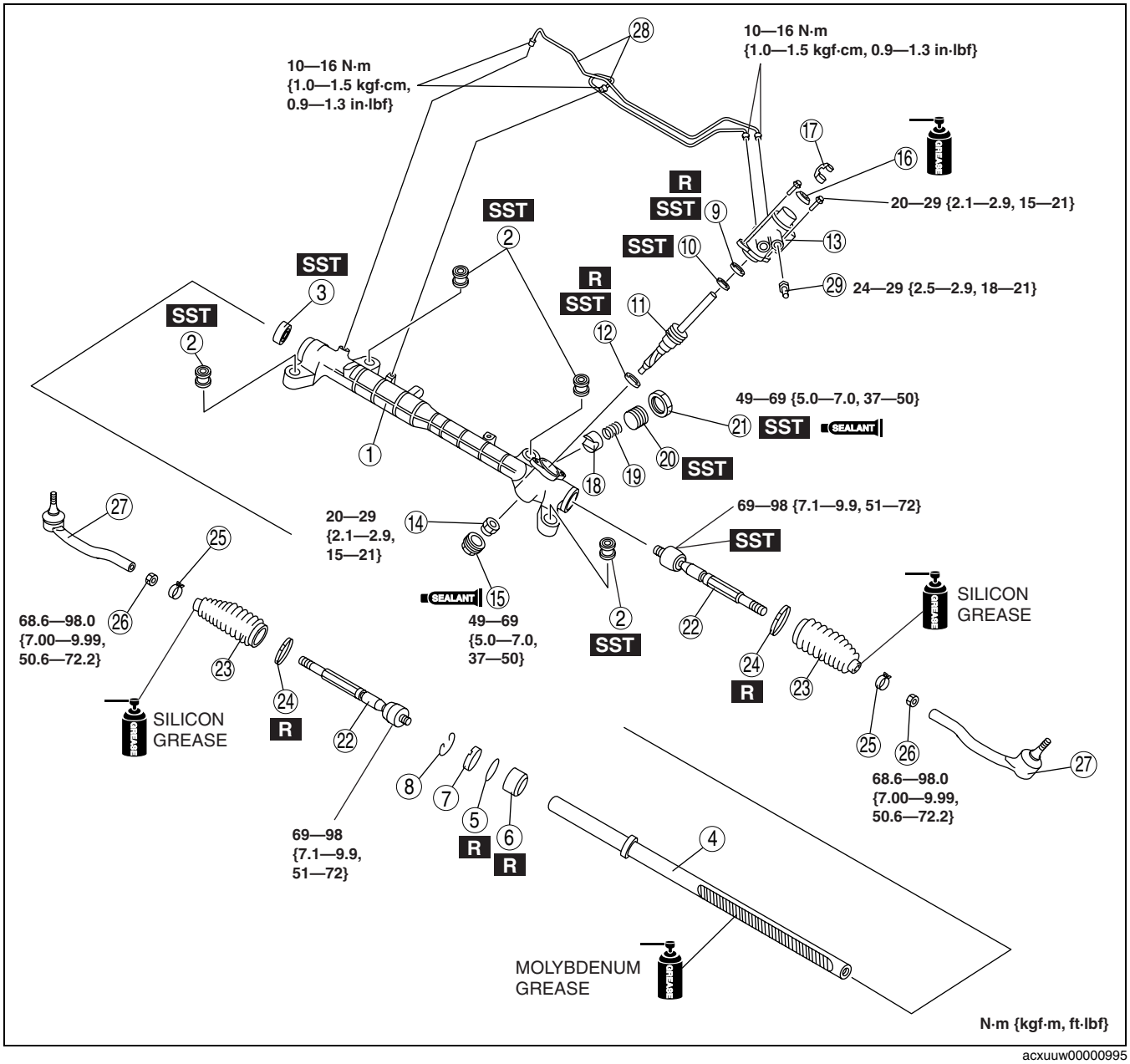
**Caution**
- **Place copper plates, rag, or similar material in a vise, when securing the mounting bracket portion of the steering gear.**

1. Assemble in the order indicated in the table.

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| | |
|---|---|
| 1 | Gear housing |
| 2 | Mounting rubber<br>(See 06-14-16 Mounting Rubber Assembly Note.) |
| 3 | Oil seal<br>(See 06-14-17 Oil Seal Assembly Note.) |
| 4 | Steering rack<br>(See 06-14-17 Steering Rack Assembly Note.) |
| 5 | O-ring |
| 6 | Rack bushing |
| 7 | Stopper<br>(See 06-14-18 Stopper Assembly Note.) |
| 8 | Clip |
| 9 | Oil seal (upper side)<br>(See 06-14-18 Oil seal (Upper side) Assembly Note.) |
| 10 | Bearing (upper side)<br>(See 06-14-18 Bearing (upper side) Assembly Note.) |

| | |
|---|---|
| 11 | Pinion shaft<br>(See 06-14-19 Pinion Shaft Assembly Note.) |
| 12 | Oil seal (lower side)<br>(See 06-14-19 Oil Seal (lower side) Assembly Note.) |
| 13 | Valve housing component |
| 14 | Locknut (pinion shaft side) |
| 15 | Housing cover<br>(See 06-14-19 Housing Cover Assembly Note.) |
| 16 | Dust cover<br>(See 06-14-19 Dust cover Assembly Note.) |
| 17 | Clip |
| 18 | Support yoke |
| 19 | Yoke spring |
| 20 | Adjusting cover<br>(See 06-14-19 Adjusting Cover, Locknut (Adjusting Cover) Assembly Note.) |

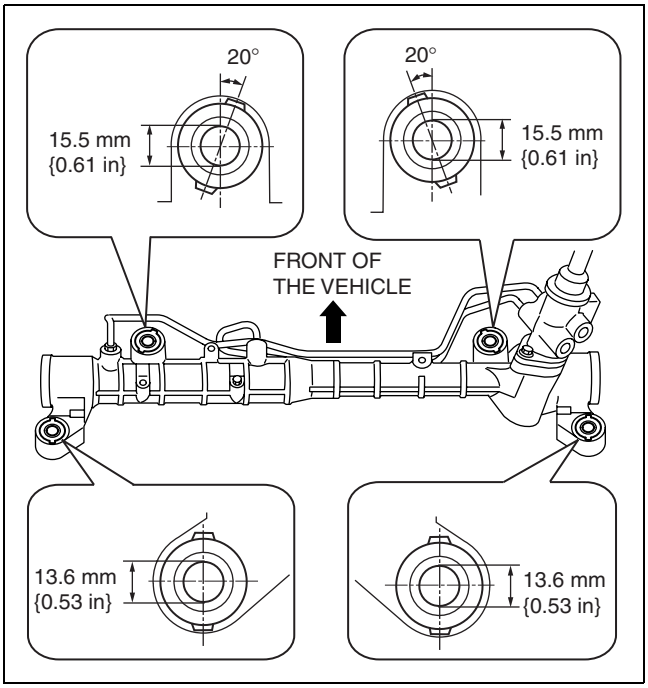
| | |
|---|---|
| 21 | Locknut (adjusting cover)<br>(See 06-14-19 Adjusting Cover, Locknut (Adjusting Cover) Assembly Note.) |
| 22 | Tie rod<br>(See 06-14-20 Tie-rod Assembly Note.) |
| 23 | Boot<br>(See 06-14-21 Boot Assembly Note.) |
| 24 | Boot band |
| 25 | Boot clamp |
| 26 | Locknut |
| 27 | Tie-rod end |
| 28 | Oil pipe |
| 29 | Return pipe |

**Mounting Rubber Assembly Note**

1. Apply soapy water to the rubber part of the mounting rubber.
2. Temporarily install the steering gear so that the mounting rubber are in the positions shown in the figure.

**Caution**

- **If the mounting rubber is placed in the wrong position or assembled in the wrong direction, an installation malfunction will result when the vehicle is loaded. When assembling the mounting rubber, verify the position and directions.**

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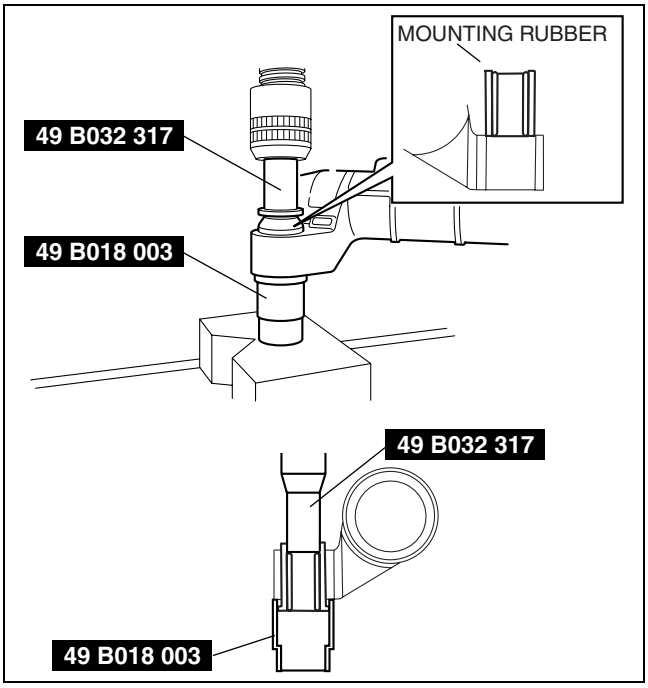
3. Press the mounting rubber until the mounting rubber end comes out completely from the gear housing using the **SSTs** and a press.
   **Substitution SST**
   - **49 B032 317**
     Outer diameter: 17.5— 23 mm {0.7— 0.9 in}
     Length 35 mm {1.4 in} or more.
   - **49 B018 003**
     Outer diameter: 36— 38 mm {1.42— 1.49 in}

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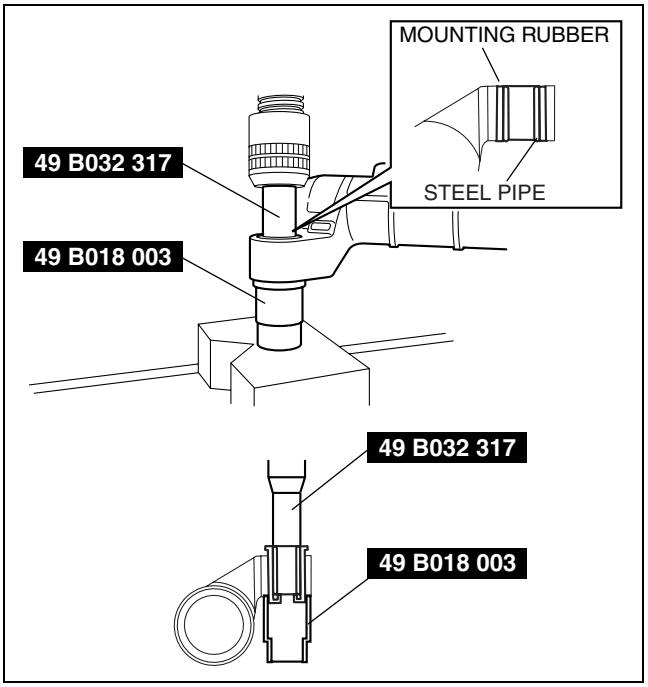
4. Reverse the gear housing, then press the mounting rubber until the mounting rubber end comes out completely from the other side. At this time, make sure that the mounting rubber and steel pipe are aligned.

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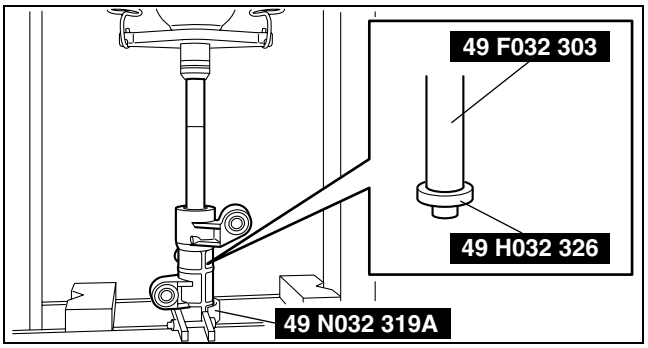
**Oil Seal Assembly Note**

1. Apply ATF to the lip of a new oil seal.
2. Install the **SST** (49 N032 319A) to the gear housing with the raised part facing up as shown in the figure.
3. Set the stopper into the gear housing to hold the **SSTs** as shown in the figure.
4. Install the oil seal using the **SSTs** (49 F032 303, 49 H032 326) and a press.

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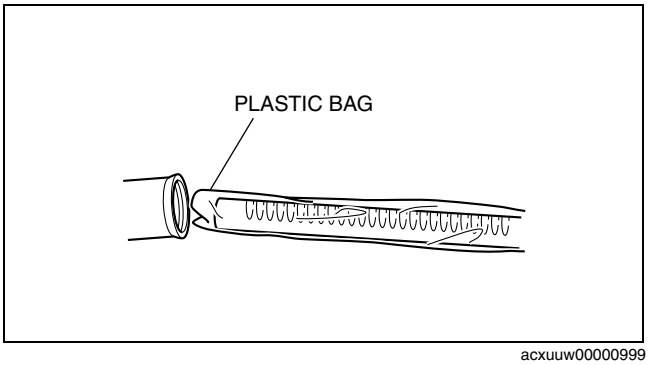
**Steering Rack Assembly Note**

1. Apply multipurpose grease to the rack teeth.
2. Install a plastic bag to the rack teeth and insert the steering rack in the gear housing.

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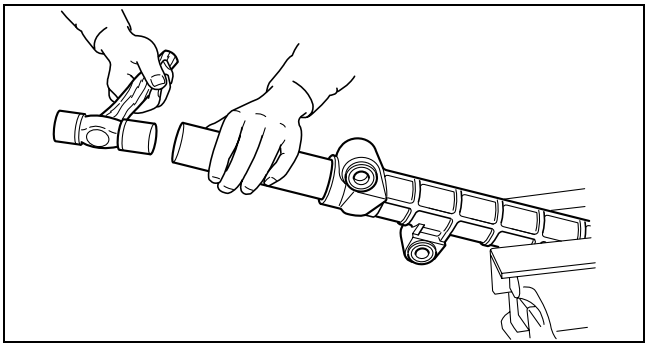
**Stopper Assembly Note**

1. Using an appropriate pipe and a hammer, insert the rack stopper into the gear housing until the clip installation groove of the gear housing comes out.



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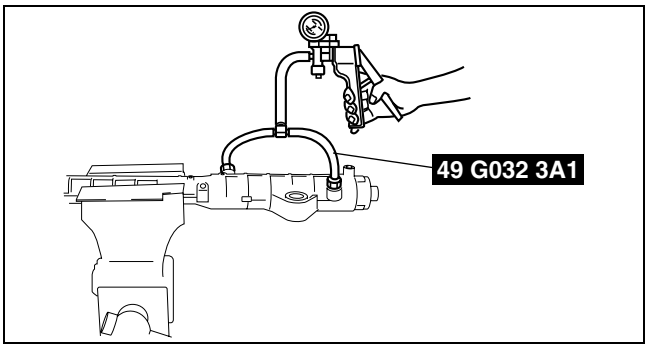
2. Apply **53.3 kPa {400 mmHg, 15.8 inHg}** vacuum with a vacuum pump and verify that it is held for **30 s.**
   - If the vacuum is not held, replace the oil seal.

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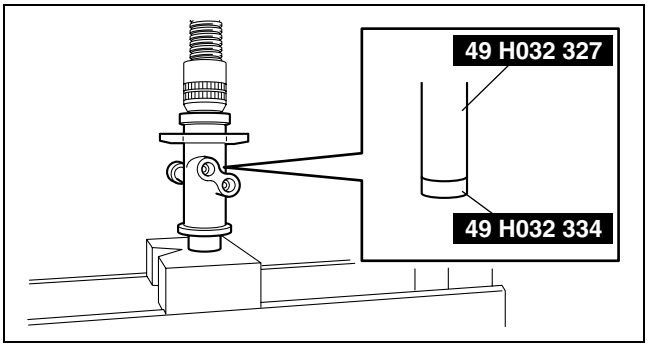
**Oil seal (Upper side) Assembly Note**

1. Assemble the oil seal (upper side) using the **SST**.
   **Substitution SST**
   - **49 H032 327**
     Outer diameter: 30— 34 mm {1.2— 1.3 in}
   - **49 H032 334**
     Outer diameter: 30— 32 mm {1.19— 1.25 in}

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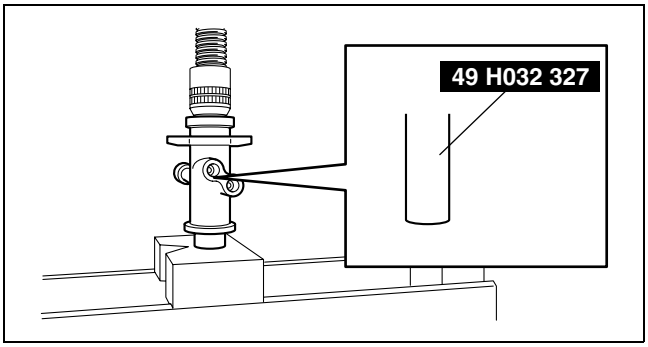
**Bearing (upper side) Assembly Note**

1. Assemble the bearing (upper side) using the **SST**.
   **Substitution SST**
   - **49 H032 327**
     Outer diameter: 30— 34 mm {1.2— 1.3 in}

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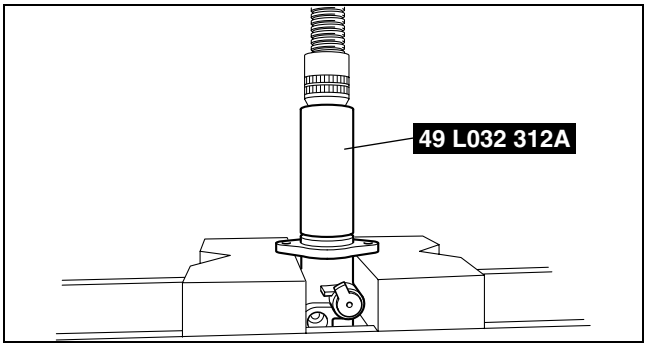
**Oil Seal (lower side) Assembly Note**

1. Assemble the oil seal (lower side) using the **SST**.
   **Substitution SST**
   - **49 L032 312A**
     Outer diameter: 35— 36 mm {1.2— 1.3 in}
     Cylindrical shape outer diameter of 40 mm {1.6 in} or more.



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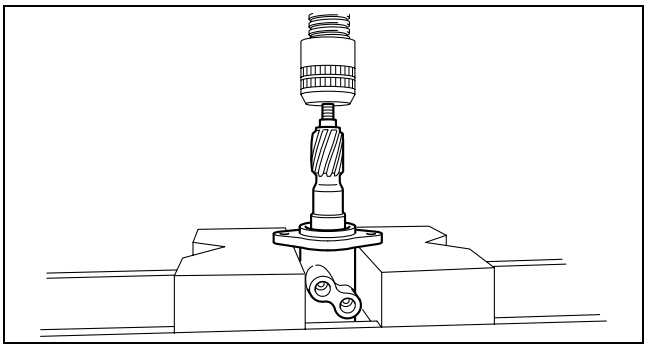
**Pinion Shaft Assembly Note**

1. Assemble the pinion shaft using a press.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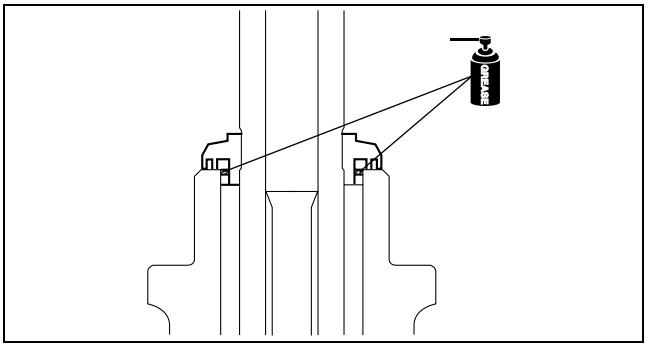
**Housing Cover Assembly Note**

1. Apply silicone sealant to the threads of the housing cover.
2. Assemble the housing cover.

**Dust cover Assembly Note**

1. Apply grease to the oil dust cover shown in the figure.

   **Specified grease**
   - **Rubber grease (Mazda genuine parts) or equivalent.**



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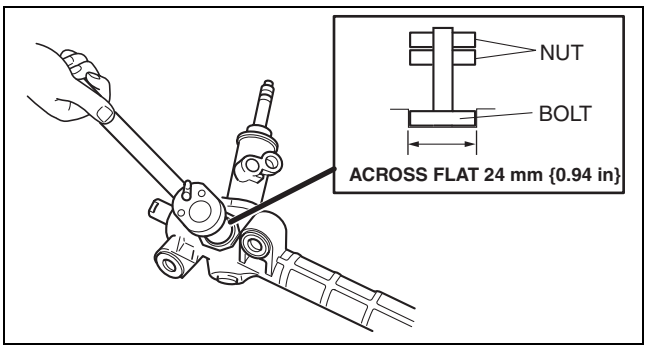
**Adjusting Cover, Locknut (Adjusting Cover) Assembly Note**

1. Install two nuts to the bolt across a flat **24 mm {0.94 in}** and tighten them using a wrench.
2. Using the bolt/nut produced in Step 1, install the adjusting cover.
   (1) Tighten the adjusting cover with a tightening torque of **20.0 N·m {2.0 kgf·m, 14.8 ft·lbf}**.



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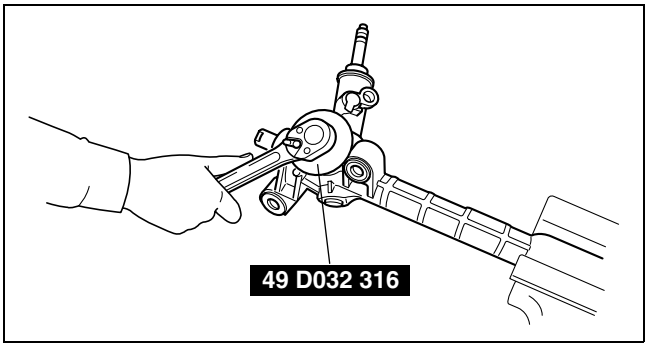
(2) Using the **SST**, loosen the adjusting cover to **25—30°.**

3. Apply sealant to the locknut.

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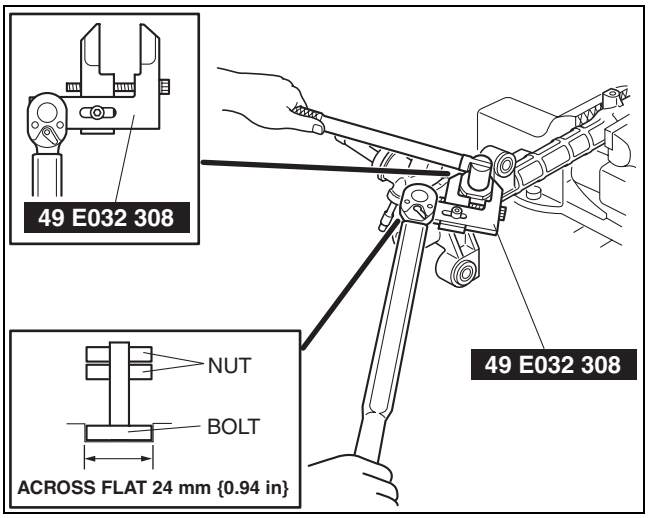
4. Secure the adjusting cover with the bolt and nuts created in Step 1, and tighten the locknut using the **SST**.

**Caution**

- **If a tool such as a torque wrench is installed to the SST (49 E032 308), install the tool so that it is perpendicular to the SST as shown in the figure. If the tool is not installed as instructed, the SST can separate from the locknut easily which could cause damage to the locknut while doing the work.**

**Note**

- Be sure that the adjusting cover will not turn together with the locknut.

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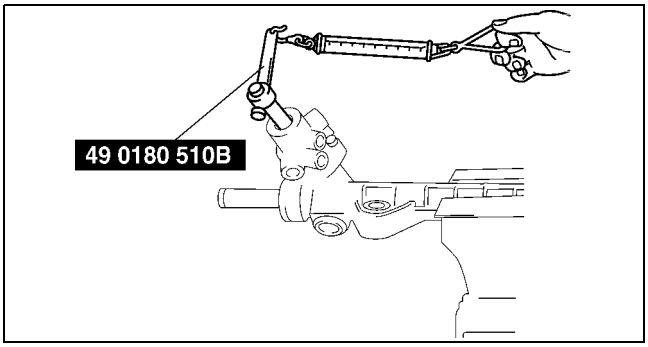
5. Measure the pinion torque using the **SST** and pull scale.
   - If not as specified, remove the locknut and adjust the adjusting cover.

**Pinion shaft rotation torque**
**Center of rack ±90°:0.88—1.48 N·m {8.98—15.0 kgf·cm, 7.79—13.0 in·lbf}**

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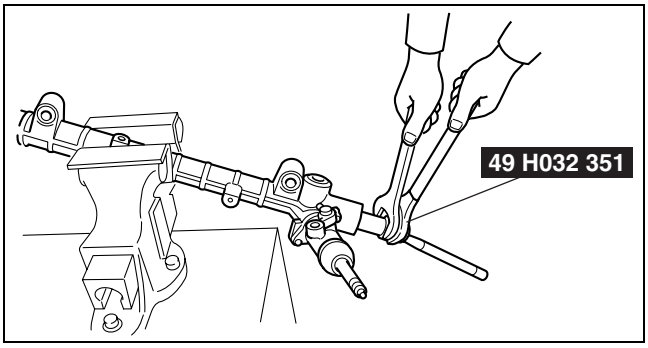
**Tie-rod Assembly Note**

1. Lock the steering rack end against rotation with a suitable wrench and install the tie rod using the **SST**.
   **Substitution SST**
   - **49 H032 351**
     Width across flats 34mm {1.3 in} (Torque control enabled wrench)

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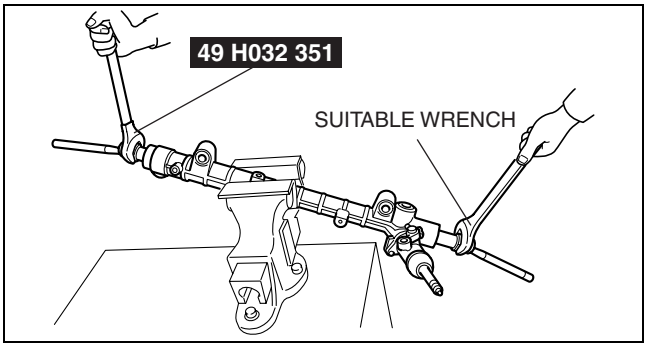
2. Lock the steering rack end against rotation with a suitable wrench and install the other side tie rod using the **SST**.
   **Substitution SST**
   - **49 H032 351**
     Width across flats 34mm {1.3 in} (Torque control enabled wrench)

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**Boot Assembly Note**
1. Apply silicone grease to the rubber lip groove.
2. Assemble the boot.

**POWER STEERING OIL PUMP REMOVAL/INSTALLATION**

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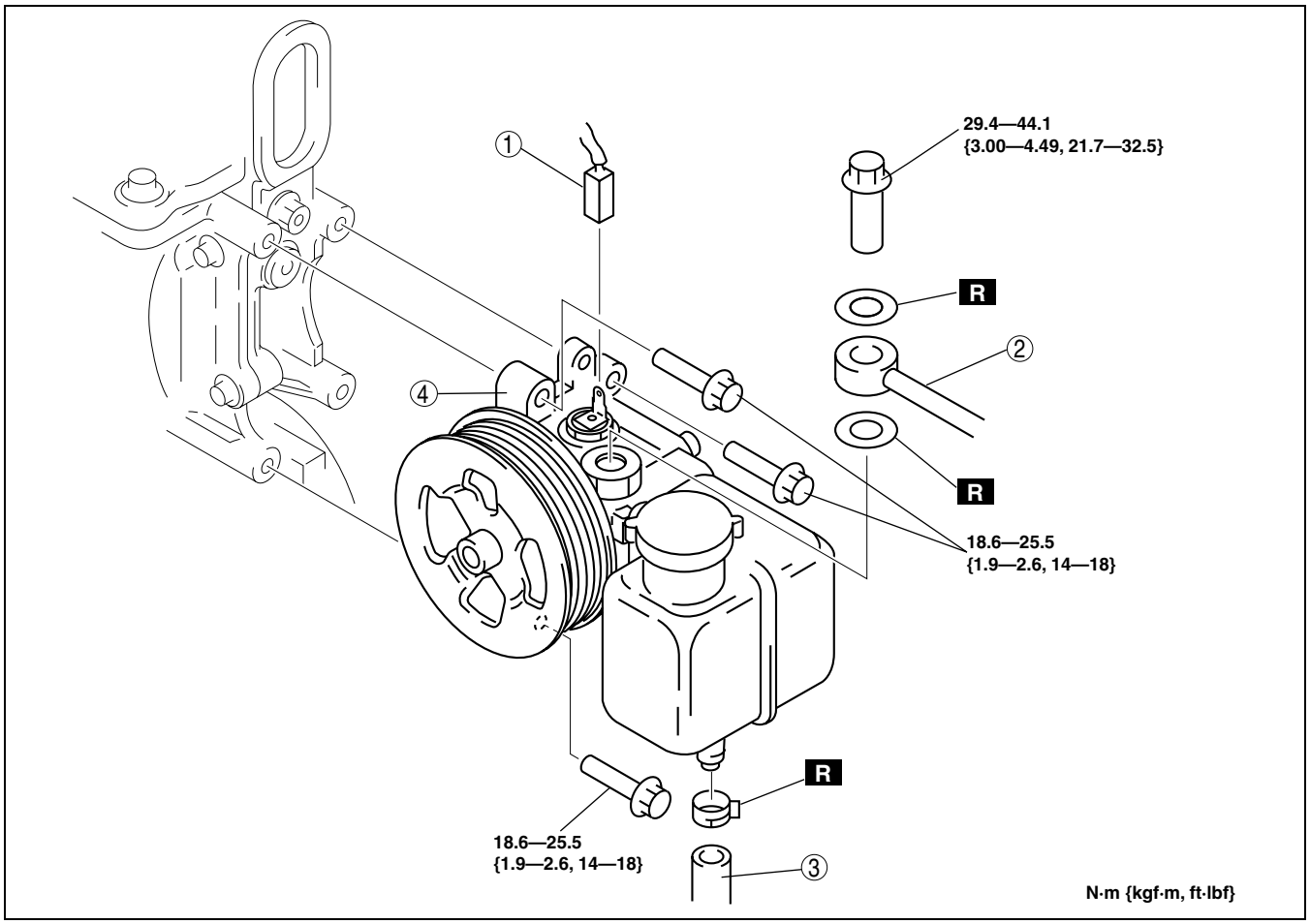
1. Remove the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.






acxuuw00001346

| | |
|---|---|
| 1 | Pressure switch connector |
| 2 | Pressure pipe |

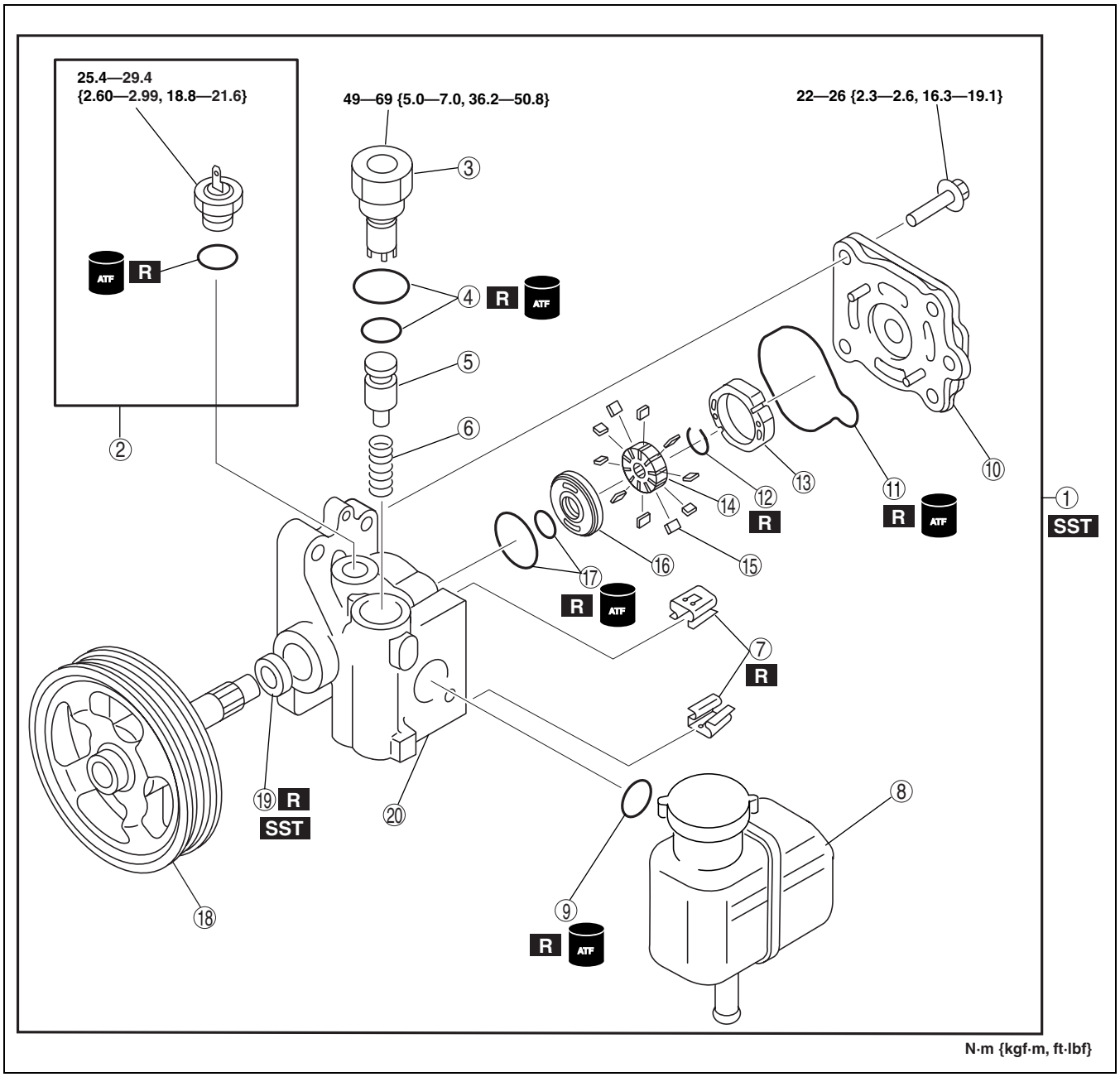
| | |
|---|---|
| 3 | Return hose |
| 4 | Power steering oil pump |

## POWER STEERING OIL PUMP DISASSEMBLY/ASSEMBLY

id061400800800

**Note**
- The following procedure is for replacement of the O-ring and oil seal only. Replace the pump component if other repairs are necessary.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.




acxuuw00001915

| | |
|---|---|
| 1 | Power steering oil pump component<br>(See 06-14-23 Power Steering Oil Pump Component Disassembly Note.) |
| 2 | Pressure switch component |
| 3 | Connector |
| 4 | O-ring |
| 5 | Control valve |
| 6 | Spring |

| | |
|---|---|
| 7 | Clip<br>(See 06-14-23 Clip Disassembly Note.)<br>(See 06-14-25 Clip Assembly Note.) |
| 8 | Fluid reservoir |
| 9 | O-ring |
| 10 | Rear pump body<br>(See 06-14-25 Rear Pump Body Assembly Note.) |
| 11 | Gasket |
| 12 | Clip |

| | |
|---|---|
| 13 | Cam ring<br>(See 06-14-25 Cam Ring Assembly Note.) |
| 14 | Rotor<br>(See 06-14-25 Rotor Assembly Note.) |
| 15 | Vane |
| 16 | Side plate<br>(See 06-14-24 Side plate Assembly Note.) |
| 17 | O-rings |

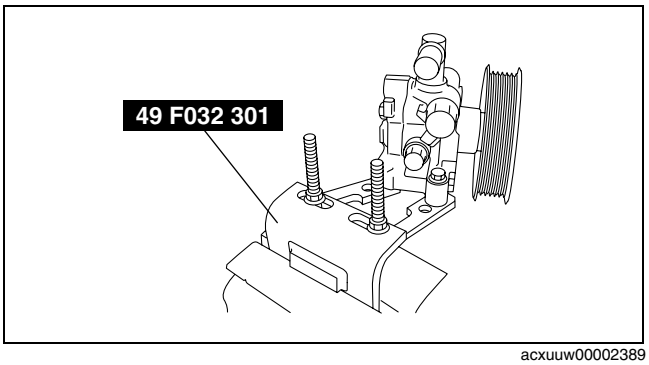
| | |
|---|---|
| 18 | Shaft component<br>(See 06-14-24 Shaft Component Disassembly Note.) |
| 19 | Oil seal<br>(See 06-14-24 Oil seal Disassembly Note.)<br>(See 06-14-24 Oil seal Assembly Note.) |
| 20 | Front pump body |

**Power Steering Oil Pump Component Disassembly Note**

1. Secure the power pressure oil pump using the **SST.**

**Caution**

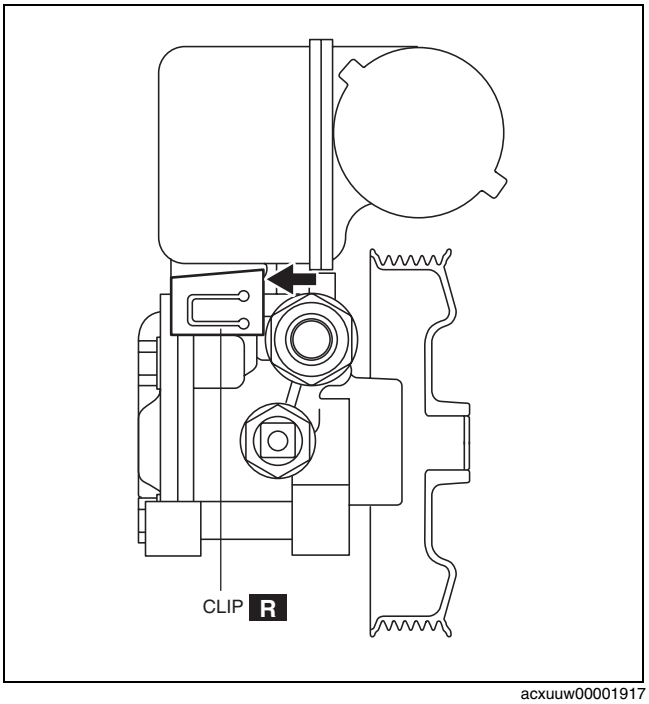
- **Use the SST to prevent damage to the pump when securing it in a vise.**




acxuuw00002389

**Clip Disassembly Note**

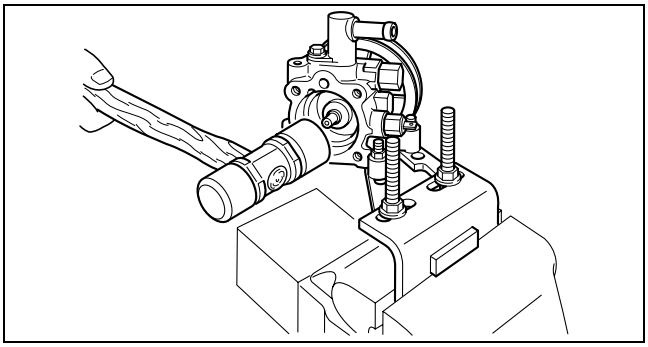
1. Lift up the clip tab using a flathead screwdriver.
2. Remove the clip pushing with a flathead screwdriver and a hammer as shown in the figure.




acxuuw00001917

**Shaft Component Disassembly Note**

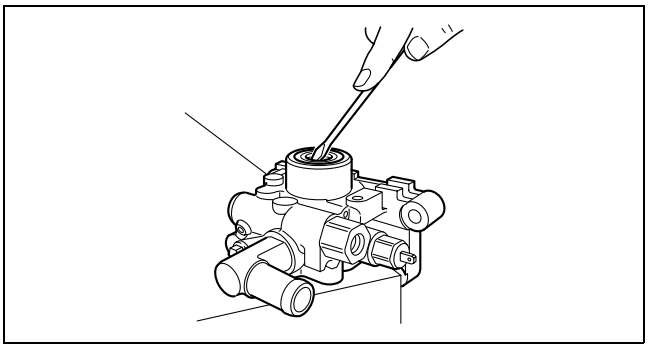
1. Tap out the shaft component from the front pump body using a plastic hammer.



acxuuw00002347

**Oil seal Disassembly Note**

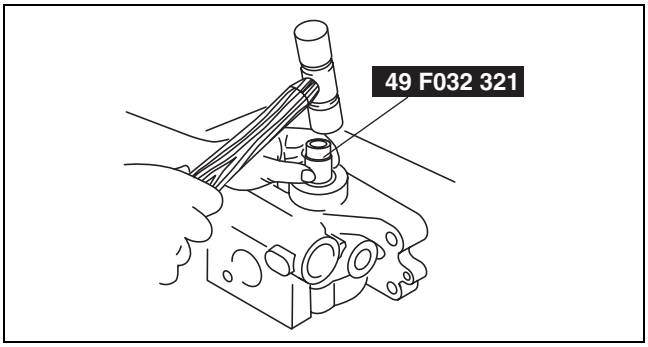
1. Remove the oil seal from the front pump body using a flathead screwdriver.



acxuuw00002348

**Oil seal Assembly Note**

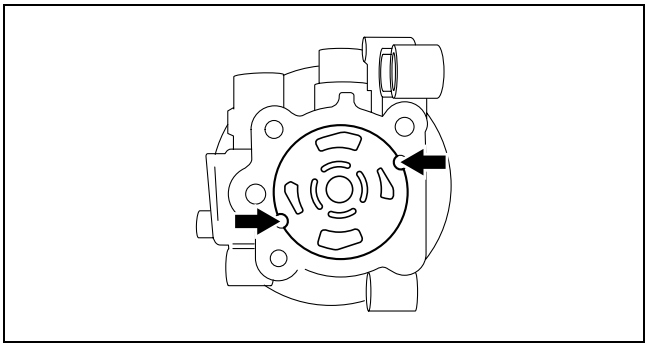
1. Install the oil seal in the front pump body using the **SST** and plastic hammer.




acxuuw00001919

**Side plate Assembly Note**

1. Install the side plate in the position shown in the figure.



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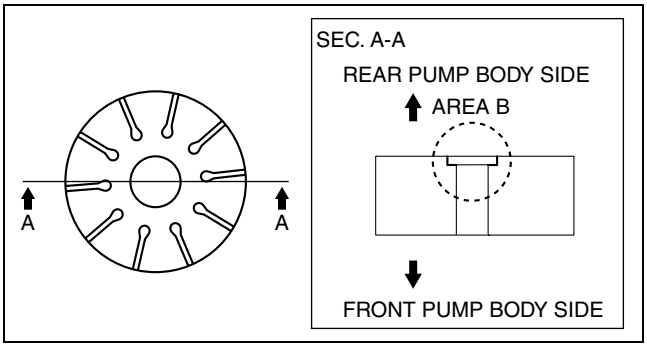
**Rotor Assembly Note**

1. Install to the front pump body so that area B of the groove is on the rear pump body side as shown in the figure.

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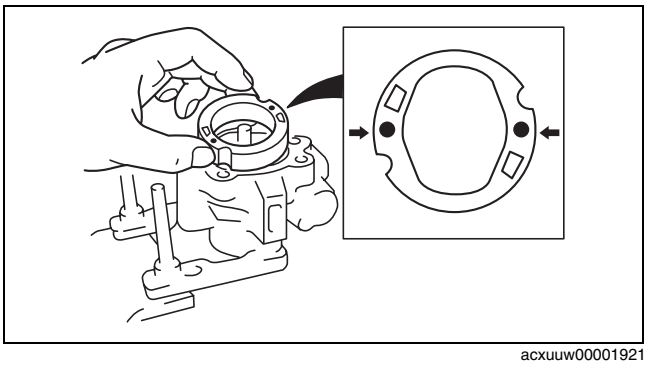
**Cam Ring Assembly Note**

1. Install the cam ring in the front pump body with the mark facing upward.



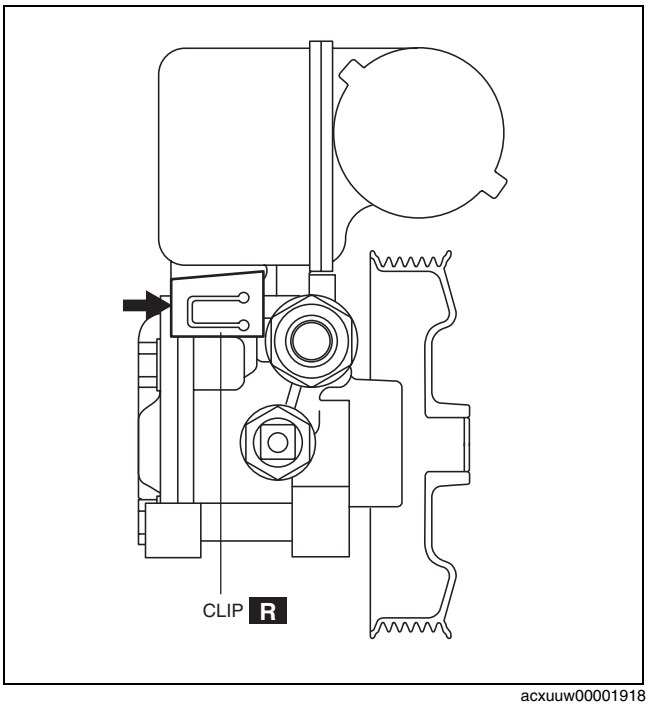
acxuuw00001921

**Rear Pump Body Assembly Note**

1. After installing the rear body, manually turn the shaft to verify that it rotates smoothly.

**Clip Assembly Note**

1. Push the clip slowly in the direction shown in the figure.
2. Confirm that the clip tab is caught correctly.

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# 06-50 TECHNICAL DATA

**STEERING TECHNICAL DATA. . . . . 06-50–1**

## STEERING TECHNICAL DATA

id065000800200

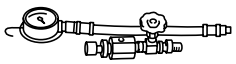
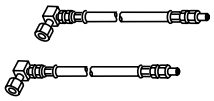
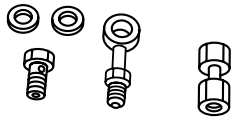
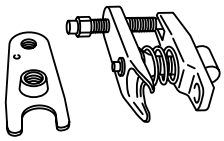
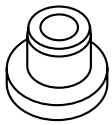
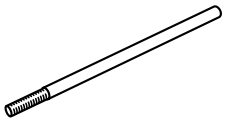
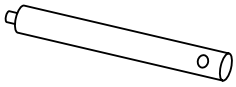
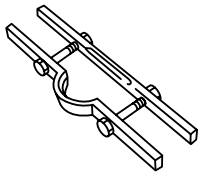
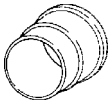
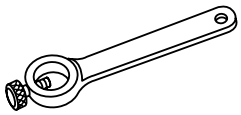
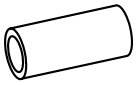
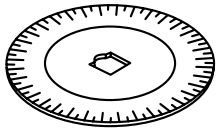
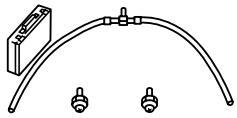
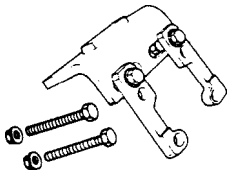
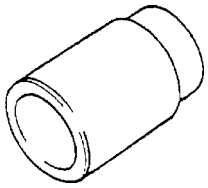
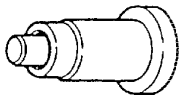
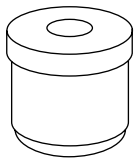
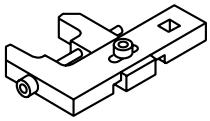
| Item | Specification |
|---|---|
| Power steering fluid type | ATF M-III, M-V or equivalent (e.g. Dexron®II) |
| Power steering fluid capacity (approx. quantity) | 2WD, AWD (except Mexico spec.): 0.89 L {0.94 US qt, 0.78 Imp qt}<br>AWD (Mexico spec.): 0.98 L {1.0 US qt, 0.86 Imp qt} |
| Oil pump fluid pressure | 10.31—10.80 MPa {105.2—110.1 kgf/cm$^2$, 1,496—1,566 psi} |
| Gear housing fluid pressure | 10.31—10.80 MPa {105.2—110.1 kgf/cm$^2$, 1,496—1,566 psi} |
| Steering wheel play | 0—30 mm {0—1.18 in} |
| Steering wheel effort (reference value) | 7.8 N·m {80 kgf·cm, 69 in·lbf} max. |
| Steering shaft length | 211.6 mm {8.3 in} |
| Steering rack runout | Large diameter portion (near point A): 0.15 mm {0.006 in} max.<br>Small diameter portion (near point B): 0.20 mm {0.008 in} max. |
| Tie-rod end ball joint Rotation torque | 0.5—3.0 N·m {0.06—30 kgf·cm, 5—26 in·lbf}<br>[Pull scale reading 5—30 N {0.6—3.0 kgf, 3.7—22 lbf}] |
| Tie rod ball joint swing torque | 0.4—4.0 N·m {5—40 kgf·cm, 4—35 in·lbf}<br>[Pull scale reading 4.2—41.6 N {0.43—4.24 kgf, 0.95—9.35 lbf}] |

# 06-60 SERVICE TOOLS

**STEERING SST. . . . . 06-60–1**

## STEERING SST

id066000800100

| | | |
|---|---|---|
| 49 1232 670B<br>Power steering gauge set  | 49 H002 671<br>Adapter  | 49 G032 3A4A<br>Power steering gauge adapter set  |
| 49 T028 3A0<br>Ball joint puller set  | 49 H032 326<br>Body  | 49 B032 317<br>Bearing and oil seal remover |
| 49 F032 303<br>Handle  | 49 G033 102<br>Handle  | 49 N032 319A<br>Support plate  |
| 49 B018 003<br>Body B  | 49 0180 510B<br>Preload measuring attachment  | 49 H032 334<br>Collar |
| 49 L032 312A<br>Oil Seal Installer  | 49 D032 316<br>Protractor  | 49 G032 3A1<br>Joint host set  |
| 49 F032 301<br>Power steering pump hanger  | 49 F032 321<br>Installer B (Part of 49 F032 3A2)  | 49 S032 318<br>Backup ring replacer |
| 49 H032 327<br>Oil seal & bearing installer  | 49 H032 351<br>Wrench | 49 B032 301<br>Body  |
| 49 E032 308<br>Wrench  | — | — |

# HEATER, VENTILATION & AIR CONDITIONING (HVAC)

**07**
SECTION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## 07-02 ON-BOARD DIAGNOSTIC


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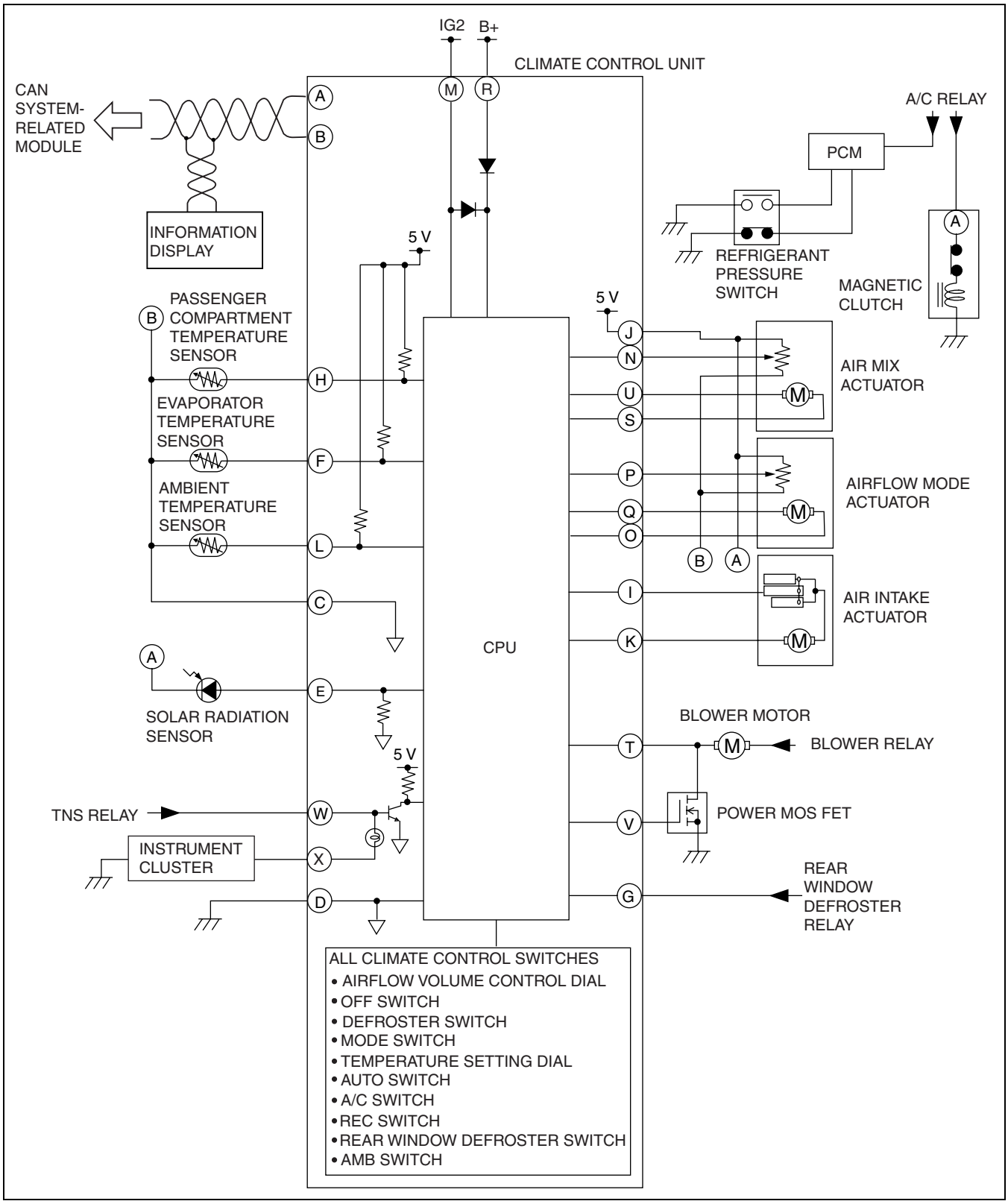
ACTIVE COMMAND MODES TABLE . . . 07-02–13

## HVAC SYSTEM WIRING DIAGRAM

id070200800100

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## DTC B1251, B1253

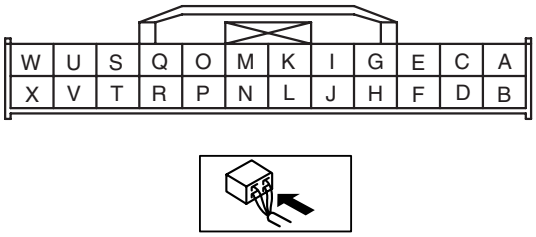
id070200800300

| DTC B1251, B1253 | Passenger compartment temperature sensor system |
|---|---|
| POSSIBLE CAUSE | • Passenger compartment temperature sensor malfunction<br>• Open or short circuit in wiring harness between climate control unit and passenger compartment temperature sensor |

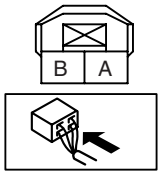
### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the passenger compartment temperature sensor. (See 07-40-23 PASSENGER COMPARTMENT TEMPERATURE SENSOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the passenger compartment temperature sensor. (See 07-40-23 PASSENGER COMPARTMENT TEMPERATURE SENSOR REMOVAL/ INSTALLATION.) |
| 2 | • Disconnect the climate control unit connector and the passenger compartment temperature sensor connector.<br>• Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the passenger compartment temperature sensor?<br>— H— B<br>— C— A | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal H and passenger compartment temperature sensor terminal B? | Yes | Repair the wiring harness. |
| | | No | Connect the climate control unit connector, then go to the next step. |
| 4 | • Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following climate control unit terminal (wiring harness-side).<br>— Terminal H (passenger compartment temperature sensor input signal)<br>• Is the voltage normal? (**Approx. 5 V)** | Yes | The system is normal at present. (Clear the malfunction from the memory.) |
| | | No | Inspect the connection of the climate control unit connector. (See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) |

CLIMATE CONTROL UNIT CONNECTOR




PASSENGER COMPARTMENT TEMPERATURE SENSOR CONNECTOR




07-02

### DTC B1251, B1253, B1255, B1257, B1274, B1275, B1282, B1283, B1947, B2014 (MULTIPLE DTCS INDICATED)

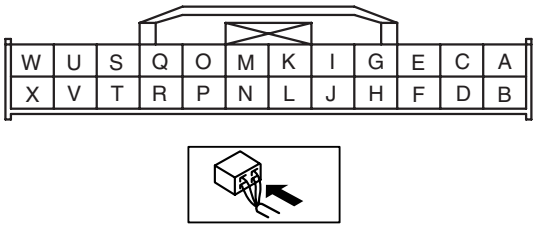
id070200800400

| DTC B1251, B1253, B1255, B1257, B1947, B2014, B1282, B1283, B1274, B1275 | Climate control unit (+5 V power supply or sensor ground) system |
|---|---|
| POSSIBLE CAUSE | • Open circuit in wiring harnesses between climate control unit and each temperature sensor, air mix actuator, or airflow mode actuator |

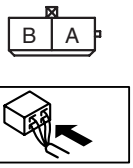
**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Disconnect the climate control unit connector and the evaporator temperature sensor connector.<br>• Is there an open circuit in the wiring harness between climate control unit terminal C and evaporator temperature sensor terminal A? | Yes | Repair the wiring harness. |
| | | No | Inspect the connection of the climate control unit connector. |

CLIMATE CONTROL UNIT CONNECTOR




EVAPORATOR TEMPERATURE SENSOR CONNECTOR




### DTC B1260, B1261

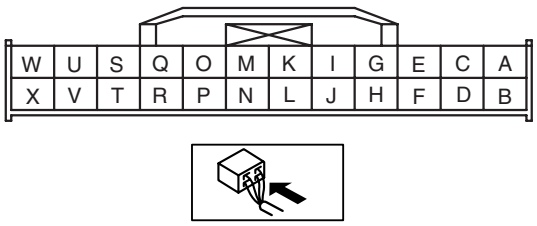
id070200800500

| DTC B1260, B1261 | Solar radiation sensor system |
|---|---|
| POSSIBLE CAUSE | • Solar radiation sensor malfunction<br>• Open or short circuit in wiring harness between climate control unit and solar radiation sensor |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the solar radiation sensor. (See 07-40-23 SOLAR RADIATION SENSOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the solar radiation sensor. (See 07-40-22 SOLAR RADIATION SENSOR REMOVAL/ INSTALLATION.) |
| 2 | • Disconnect the climate control unit connector and the solar radiation sensor connector.<br>• Is there continuity between the following terminals of the climate control unit and the solar radiation sensor?<br>— E— B<br>— J— A | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal E and solar radiation sensor terminal B? | Yes | Repair the wiring harness. |
| | | No | Inspect the connection of the climate control unit connector. (See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) |

CLIMATE CONTROL UNIT CONNECTOR




SOLAR RADIATION SENSOR CONNECTOR

## DTC B1255, B1257

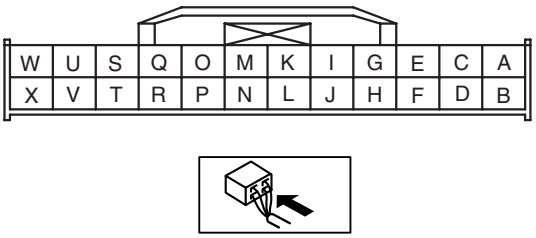
id070200800600

| DTC B1255, B1257 | Ambient temperature sensor system |
|---|---|
| POSSIBLE CAUSE | • Ambient temperature sensor malfunction<br>• Open or short circuit in wiring harness between climate control unit and ambient temperature sensor |

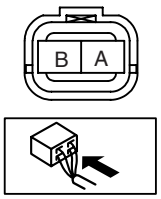
### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the ambient temperature sensor. (See 07-40-24 AMBIENT TEMPERATURE SENSOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the ambient temperature sensor. (See 07-40-24 AMBIENT TEMPERATURE SENSOR REMOVAL/ INSTALLATION.) |
| 2 | • Disconnect the climate control unit connector and the ambient temperature sensor connector.<br>• Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the ambient temperature sensor?<br>— L— B<br>— C— A | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal L and ambient temperature sensor terminal B? | Yes | Repair the wiring harness. |
| | | No | Connect the climate control unit connector, then go to the next step. |
| 4 | • Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following climate control unit terminal (wiring harness-side).<br>— Terminal L (ambient temperature sensor input signal)<br>• Is the voltage normal? (**Approx. 5 V)** | Yes | The system is normal at present. (Clear the malfunction from the memory.) |
| | | No | Inspect the connection of the climate control unit connector. (See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) |

CLIMATE CONTROL UNIT CONNECTOR




AMBIENT TEMPERATURE SENSOR CONNECTOR




07-02

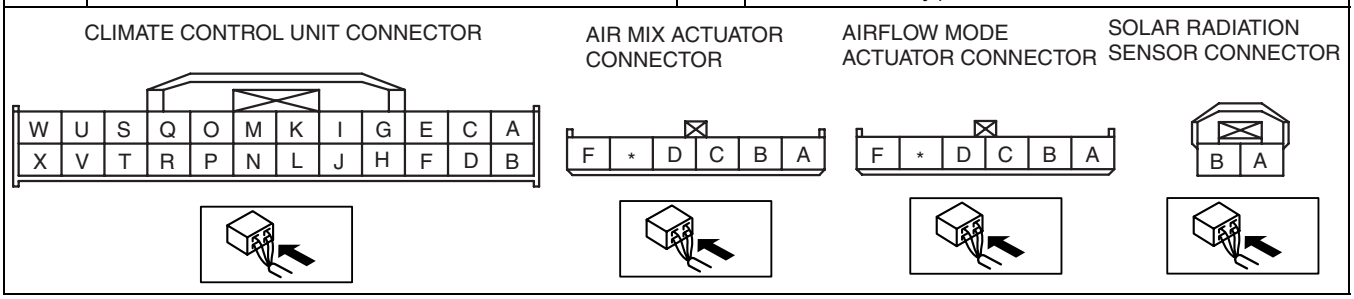
## DTC B1260, B1261, B1274, B1275, B1282, B1283 (MULTIPLE DTCS INDICATED)

id070200800700

| | |
|---|---|
| **DTC B1260, B1261, B1282, B1283, B1274, B1275** | **Climate control unit (+5 V power supply) system** |
| **POSSIBLE CAUSE** | • Open or short circuit in wiring harnesses between climate control unit and solar radiation sensor, air mix actuator, or airflow mode actuator |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Disconnect the climate control unit connector and the airflow mode actuator connector.<br>• Is there an open circuit in the wiring harness between climate control unit terminal J and airflow mode actuator terminal B? | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 2 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal J and airflow mode actuator terminal B? | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal J and air mix actuator terminal A? | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 4 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal J and solar radiation sensor terminal A? | Yes | Repair the wiring harness. |
| | | No | The system is normal at present. (Clear the malfunction from the memory.) |



## DTC B1274, B1275

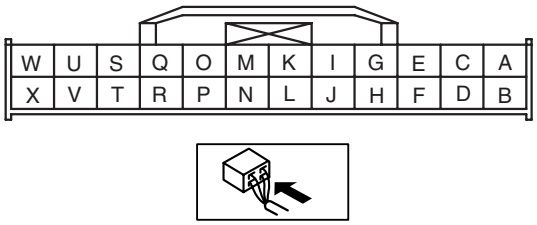
id070200800800

| DTC B1274, B1275 | Airflow mode actuator (potentiometer) system |
|---|---|
| POSSIBLE CAUSE | • Airflow mode actuator malfunction<br>• Open circuit in wiring harness between climate control unit and airflow mode actuator<br>• Short circuit in wiring harness between climate control unit (terminal P) and airflow mode actuator (terminal C) |

### Diagnostic Procedure

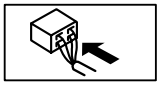
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the airflow mode actuator. (See 07-40-11 AIRFLOW MODE ACTUATOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the airflow mode actuator. (See 07-40-10 AIRFLOW MODE ACTUATOR REMOVAL/ INSTALLATION.) |
| 2 | • Disconnect the climate control unit connector and the airflow mode actuator connector.<br>• Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the airflow mode actuator?<br>— J— B<br>— P— C<br>— C— A | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal P and airflow mode actuator terminal C? | Yes | Repair the wiring harness. |
| | | No | The system is normal at present. (Clear the malfunction from the memory.) |

CLIMATE CONTROL UNIT CONNECTOR






AIRFLOW MODE ACTUATOR CONNECTOR



07-02

### DTC B1282, B1283

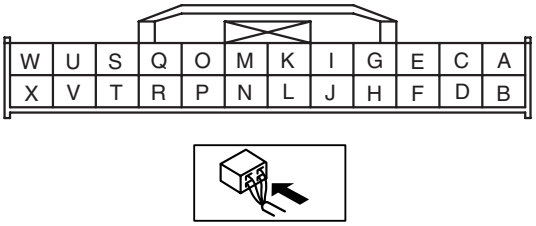
id070200800900

| DTC B1282, B1283 | Air mix actuator (potentiometer) system |
|---|---|
| POSSIBLE CAUSE | • Air mix actuator malfunction<br>• Open circuit in wiring harness between climate control unit and air mix actuator<br>• Short circuit in wiring harness between climate control unit (terminal N) and air mix actuator (terminal C) |

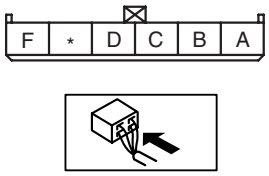
**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the air mix actuator. (See 07-40-21 AIR MIX ACTUATOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the air mix actuator. (See 07-40-19 AIR MIX ACTUATOR REMOVAL/INSTALLATION.) |
| 2 | • Disconnect the climate control unit connector and the air mix actuator connector.<br>• Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the air mix actuator?<br>— J— A<br>— N— C<br>— C— B | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal N and air mix actuator terminal C? | Yes | Repair the wiring harness. |
| | | No | The system is normal at present. (Clear the malfunction from the memory.) |

CLIMATE CONTROL UNIT CONNECTOR




AIR MIX ACTUATOR CONNECTOR




### DTC B1947, B2014

id070200801000

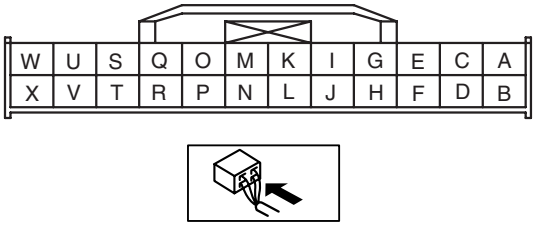
| DTC B1947, B2014 | Evaporator temperature sensor system |
|---|---|
| POSSIBLE CAUSE | • Evaporator temperature sensor malfunction<br>• Open or short circuit in wiring harness between climate control unit and evaporator temperature sensor |

**Diagnostic Procedure**

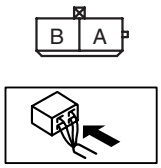
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the evaporator temperature sensor. (See 07-40-9 EVAPORATOR TEMPERATURE SENSOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the evaporator temperature sensor. (See 07-40-8 EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION.) |
| 2 | • Disconnect the climate control unit connector and the evaporator temperature sensor connector.<br>• Is there an open circuit in the wiring harness between the following terminals of the climate control unit and the evaporator temperature sensor?<br>— F— B<br>— C— A | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 3 | • Is there a short circuit to ground in the wiring harness between climate control unit terminal F and evaporator temperature sensor terminal B? | Yes | Repair the wiring harness. |
| | | No | Connect the climate control unit connector, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | • Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following climate control unit terminal (wiring harness-side).<br>— Terminal F (evaporator temperature sensor input signal)<br>• Is the voltage normal? (**Approx. 5 V**) | Yes | The system is normal at present. (Clear the malfunction from the memory.) |
| | | No | Inspect the connection of the climate control unit connector. (See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) |

CLIMATE CONTROL UNIT CONNECTOR




EVAPORATOR TEMPERATURE SENSOR CONNECTOR




### DTC B2832

id070200801100

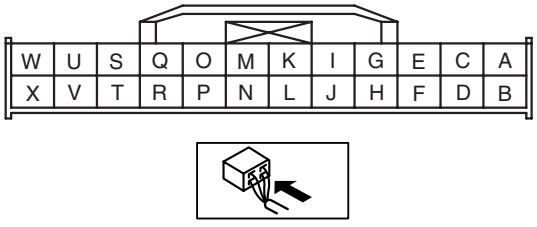
| | |
|---|---|
| **DTC B2832** | **Airflow mode actuator (motor lock) system**<br><br>**Note**<br>• **DTC B2832 will be detected when the ignition switch is turned to the ON position and approx. 30 s have passed since the mode actuator is operated.** |
| **POSSIBLE CAUSE** | • Airflow mode actuator malfunction<br>• A/C unit (airflow mode link and airflow mode crank) malfunction<br>• Open or short circuit in wiring harness between climate control unit and airflow mode actuator |

07-02

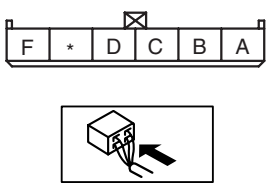
### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Disconnect the airflow mode actuator connector.<br>• Connect battery positive voltage to airflow mode actuator terminal D (or terminal F) and terminal F (or terminal D) to ground.<br>• Does the airflow mode actuator operate? | Yes | Connect the connector, then go to Step 3. |
| | | No | Go to the next step. |
| 2 | • Remove the airflow mode actuator.<br>• Operate the airflow mode main link manually.<br>• Does the airflow mode main link operate smoothly? | Yes | Replace the airflow mode actuator. (See 07-40-10 AIRFLOW MODE ACTUATOR REMOVAL/ INSTALLATION.) |
| | | No | Replace the airflow mode main link, airflow mode sub link, and the airflow mode crank. |
| 3 | • Disconnect the climate control unit connector.<br>• Connect battery positive voltage to climate control unit terminal O (or terminal Q) and terminal Q (or terminal O) to ground.<br>• Does the airflow mode actuator operate? | Yes | Inspect the connection of the climate control unit connector. (See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) |
| | | No | Repair the wiring harness. |
| 4 | • Turn the ignition switch to the ON position.<br>• Press the MODE switch to change the mode (operate the airflow mode actuator) and wait for 30 s or more.<br>• Perform the DTC inspection.Is DTC B2832 indicated? | Yes | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |
| | | No | DTC troubleshooting completed. |

CLIMATE CONTROL UNIT CONNECTOR




AIRFLOW MODE ACTUATOR CONNECTOR



### DTC B2834

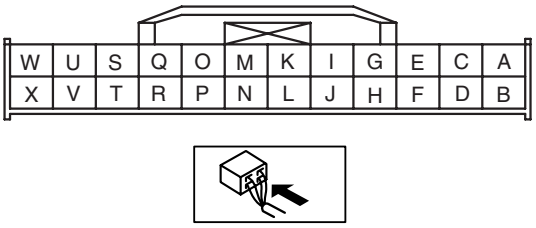
id070200801200

| | |
|---|---|
| **DTC B2834** | **Air mix actuator (motor lock) system**<br><br>**Note**<br>• **DTC B2834 will be detected when the ignition switch is turned to the ON position and approx. 30 s have passed since the mode actuator is operated.** |
| **POSSIBLE CAUSE** | • Air mix actuator malfunction<br>• A/C unit (air mix link and air mix crank) malfunction<br>• Open or short circuit in wiring harness between climate control unit and air mix actuator |

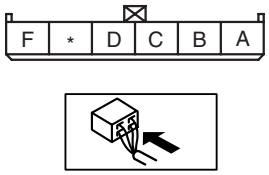
### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Disconnect the air mix actuator connector.<br>• Connect battery positive voltage to air mix actuator terminal F (or terminal D) and terminal D (or terminal F) to ground.<br>• Does the air mix actuator operate? | Yes | Connect the connector, then go to Step 3. |
| | | No | Go to the next step. |
| 2 | • Remove the air mix actuator.<br>• Operate the air mix link manually.<br>• Does the air mix link operate smoothly? | Yes | Replace the air mix actuator. (See 07-40-19 AIR MIX ACTUATOR REMOVAL/INSTALLATION.) |
| | | No | Replace the air mix link and the air mix crank. |
| 3 | • Disconnect the climate control unit connector.<br>• Connect battery positive voltage to climate control unit terminal S (or terminal U) and terminal U (or terminal S) to ground.<br>• Does the air mix actuator operate? | Yes | Inspect the connection of the climate control unit connector. (See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].) |
| | | No | Repair the wiring harness. |
| 4 | • Turn the ignition switch to the ON position.<br>• Turn the temperature setting dial to change the set temperature (operate the air mix actuator) and wait for 30 s or more.<br>• Perform the DTC inspection.Is DTC B2834 indicated? | Yes | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |
| | | No | DTC troubleshooting completed. |

CLIMATE CONTROL UNIT CONNECTOR




AIR MIX ACTUATOR CONNECTOR




### A/C OPERATION CHECK MODE

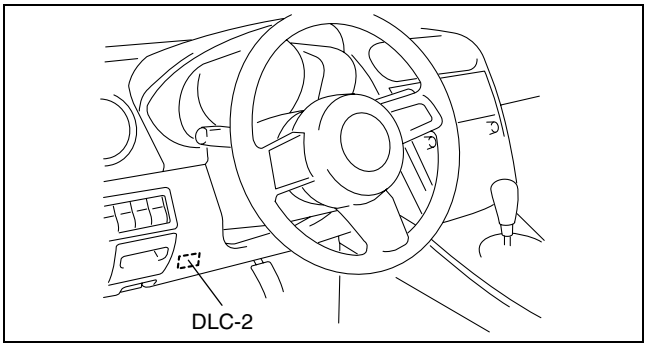
id070200801300

| M-MDS display | Target part | Operation condition |
|---|---|---|
| Illumination Of All Indicator lights | Climate control unit | All A/C indicator lights illuminated |
| Blower Motor Speed | Blower motor | OFF→ 1ST→2ND→3RD→ 4TH→ 5TH→6TH→7TH |
| Air mix Actuator | Air mix door | 0 %→50 %→100 %→50 % |
| Airflow Mode Actuator | Airflow mode door | VENT→BI-LEVEL → HEAT→HEAT/DEF →DEFROSTER |
| Air Intake Actuator / Air conditioning compressor | Air intake door<br>A/C compressor | FRESH ⇔ REC<br>ON ⇔ OFF |

* : Shown on the information display (at the set temperature display) according to each M-MDS display.

### A/C OPERATION CHECK MODE DISPLAY

id070200801400

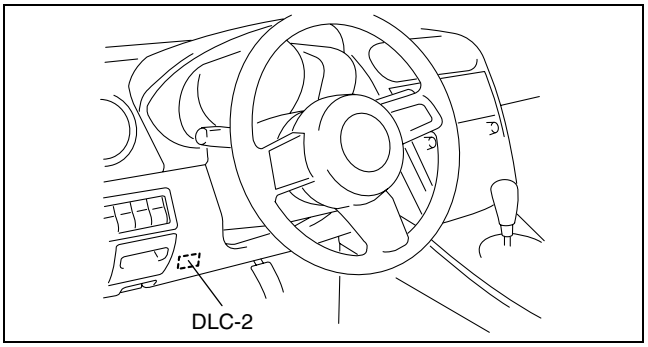



acxuuw00000748

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     — Select the “Body” tab.
   - When using the PDS (pocket PC)
     — Select “All Tests and Calibrations”.
3. Select the “EATC Operation Check” from the screen menu.
4. Verify the A/C operation check mode according to the directions on the screen.

### DTC DISPLAY

id070200801500

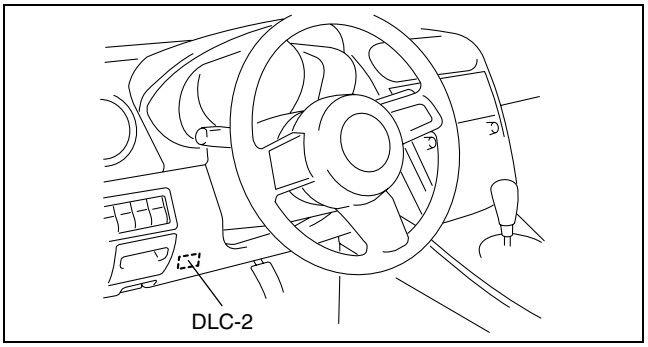



acxuuw00000748

1. Connect the M-MDS to the DLC-2 connector.
2. Shine a **60 W** incandescent light from a distance of **approx. 100 mm {3.9 in}** directly onto the solar radiation sensor.
   **Note**
   - If incandescent light is not shone on the solar radiation sensor, the climate control unit determines a malfunction and indicates DTC “B1260, B1261”.
3. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     — Select the “Toolbox” tab.
     — Select the “Self Test”.
     — Select the “Module”.
     — Select the “EATC”.
   - When using the PDS (pocket PC)
     — Select “All Tests and Calibrations”.
     — Select the “EATC”.
     — Select the “Self Test”.
4. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
5. After completion of repairs, clear all DTCs stored in the Climate control unit. (See 07-02-11 CLEARING DTC.)

### CLEARING DTC

id070200801600




acxuuw00000748

1. Connect the M-MDS to the DLC-2 connector.
2. Shine a fluorescent light directly onto the solar radiation sensor.
   **Note**
   - If fluorescent light is not shone on the solar radiation sensor, the climate control unit determines a malfunction and indicates DTC “B1260, B1261”.
3. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     — Select the “Toolbox” tab.
     — Select the “Self Test”.
     — Select the “Module”.
     — Select the “EATC”.
   - When using the PDS (pocket PC)
     — Select “All Tests and Calibrations”.
     — Select the “EATC”.
     — Select the “Self Test”.
4. Verify the DTC according to the directions on the screen.
5. Press the clear button on the DTC screen to clear the DTC.
6. Verify that no DTCs are displayed.

**DTC TABLE**

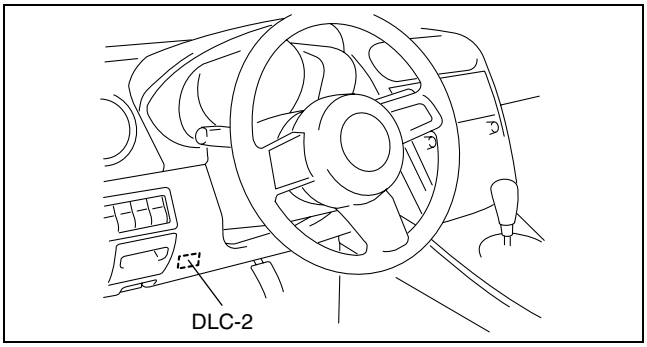
id070200801700

| DTC | Malfunction location | Detected condition | Memory function | Page |
|---|---|---|---|---|
| B1251 | Passenger compartment temperature sensor | Passenger compartment temperature sensor circuit open | X | (See 07-02-3 DTC B1251, B1253.) (See 07-02-4 DTC B1251, B1253, B1255, B1257, B1274, B1275, B1282, B1283, B1947, B2014 (MULTIPLE DTCS INDICATED).) |
| B1253 | | Passenger compartment temperature sensor circuit short (body ground) | X | |
| B1255 | Ambient temperature sensor | Ambient temperature sensor circuit open | X | (See 07-02-5 DTC B1255, B1257.) (See 07-02-4 DTC B1251, B1253, B1255, B1257, B1274, B1275, B1282, B1283, B1947, B2014 (MULTIPLE DTCS INDICATED).) |
| B1257 | | Ambient temperature sensor circuit short (body ground) | X | |
| B1260 | Solar radiation sensor | Solar radiation sensor circuit short (power supply) | X | (See 07-02-4 DTC B1260, B1261.) (See 07-02-6 DTC B1260, B1261, B1274, B1275, B1282, B1283 (MULTIPLE DTCS INDICATED).) |
| B1261 | | Solar radiation sensor circuit short (body ground) | — | |
| B1274 | Airflow mode actuator (potentiometer) | Airflow mode actuator (potentiometer) circuit short (power supply) | X | (See 07-02-7 DTC B1274, B1275.) (See 07-02-4 DTC B1251, B1253, B1255, B1257, B1274, B1275, B1282, B1283, B1947, B2014 (MULTIPLE DTCS INDICATED).) (See 07-02-6 DTC B1260, B1261, B1274, B1275, B1282, B1283 (MULTIPLE DTCS INDICATED).) |
| B1275 | | Airflow mode actuator (potentiometer) circuit short (body ground) | X | |
| B1282 | Air mix actuator (potentiometer) | Air mix actuator (potentiometer) circuit short (power supply) | X | (See 07-02-8 DTC B1282, B1283.) (See 07-02-4 DTC B1251, B1253, B1255, B1257, B1274, B1275, B1282, B1283, B1947, B2014 (MULTIPLE DTCS INDICATED).) (See 07-02-6 DTC B1260, B1261, B1274, B1275, B1282, B1283 (MULTIPLE DTCS INDICATED).) |
| B1283 | | Air mix actuator (potentiometer) circuit short (body ground) | X | |
| B1947 | Evaporator temperature sensor | Evaporator temperature sensor circuit short (body ground) | X | (See 07-02-8 DTC B1947, B2014.) (See 07-02-4 DTC B1251, B1253, B1255, B1257, B1274, B1275, B1282, B1283, B1947, B2014 (MULTIPLE DTCS INDICATED).) |
| B2014 | | Evaporator temperature sensor circuit open | X | |
| B2832 | Airflow mode actuator (motor lock) | Airflow mode actuator motor lock | X | (See 07-02-9 DTC B2832.) |
| B2834 | Air mix actuator (motor lock) | Air mix actuator motor lock | X | (See 07-02-10 DTC B2834.) |
| U0155 | CAN communication system | Reception error in signal from ICM (HEC) | X | — |
| U0516 | | BUS OFF error | X | — |

### PID/DATA MONITOR DISPLAY

id070200801800

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     — Select the “Toolbox” tab.
     — Select the “Data Logger”.
     — Select the “Module”.
     — Select the “EATC”.
   - When using the PDS (pocket PC)
     — Select the “Module Tests”.
     — Select the “EATC”.
     — Select the “Data Logger”.
3. Select the applicable PID from the PID table
4. Verify the PID data according to the directions on the screen.

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**Note**

- The PID data screen function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually.



### PID/DATA MONITOR TABLE

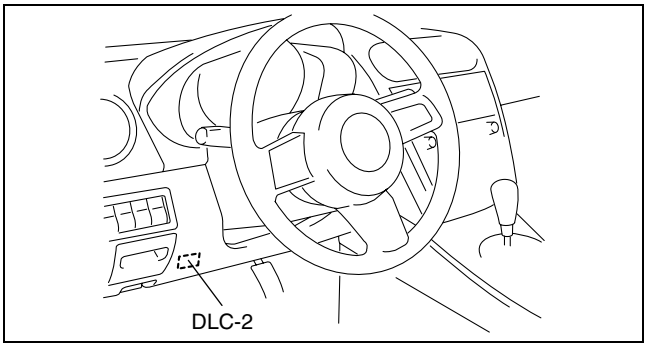
id070200801900

| PID name (definition) | Unit/Condition | Operation Condition (Reference) |
|---|---|---|
| DTC_CNT<br>(Number of continuous DTCs) | — | Indicates number of DTC |

### ACTIVE COMMAND MODES DISPLAY

id070200809400

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     — Select the “Toolbox” tab.
     — Select the “Data Logger”.
     — Select the “Module”.
     — Select the “EATC”.
   - When using the PDS (pocket PC)
     — Select the “Module Tests”.
     — Select the “EATC”.
     — Select the “Data Logger”.
3. Select the active command modes from the PID table.
4. Perform the active command modes, inspect the operations for each parts.
   - If there is no operation sound from the relay, motor, and solenoid after the active command mode inspection is performed, it is possible that there is an open or short circuit in the wiring harness, relay, motor or solenoid, or sticking and operation malfunction.

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### ACTIVE COMMAND MODES TABLE

id070200809500

| Command name | Output part | Operation | Operating condition |
|---|---|---|---|
| MIX_ACT | Air Mix Actuator | On/Off | Ignition switch at ON |
| REC/FRESH | REC/FRESH Switch | | |
| DISPLAY | Information Display | | |
| BLOWER | Blower Motor | | |
| MODE_ACT | Airflow Mode Actuator | | |

# 07-03 SYMPTOM TROUBLESHOOTING

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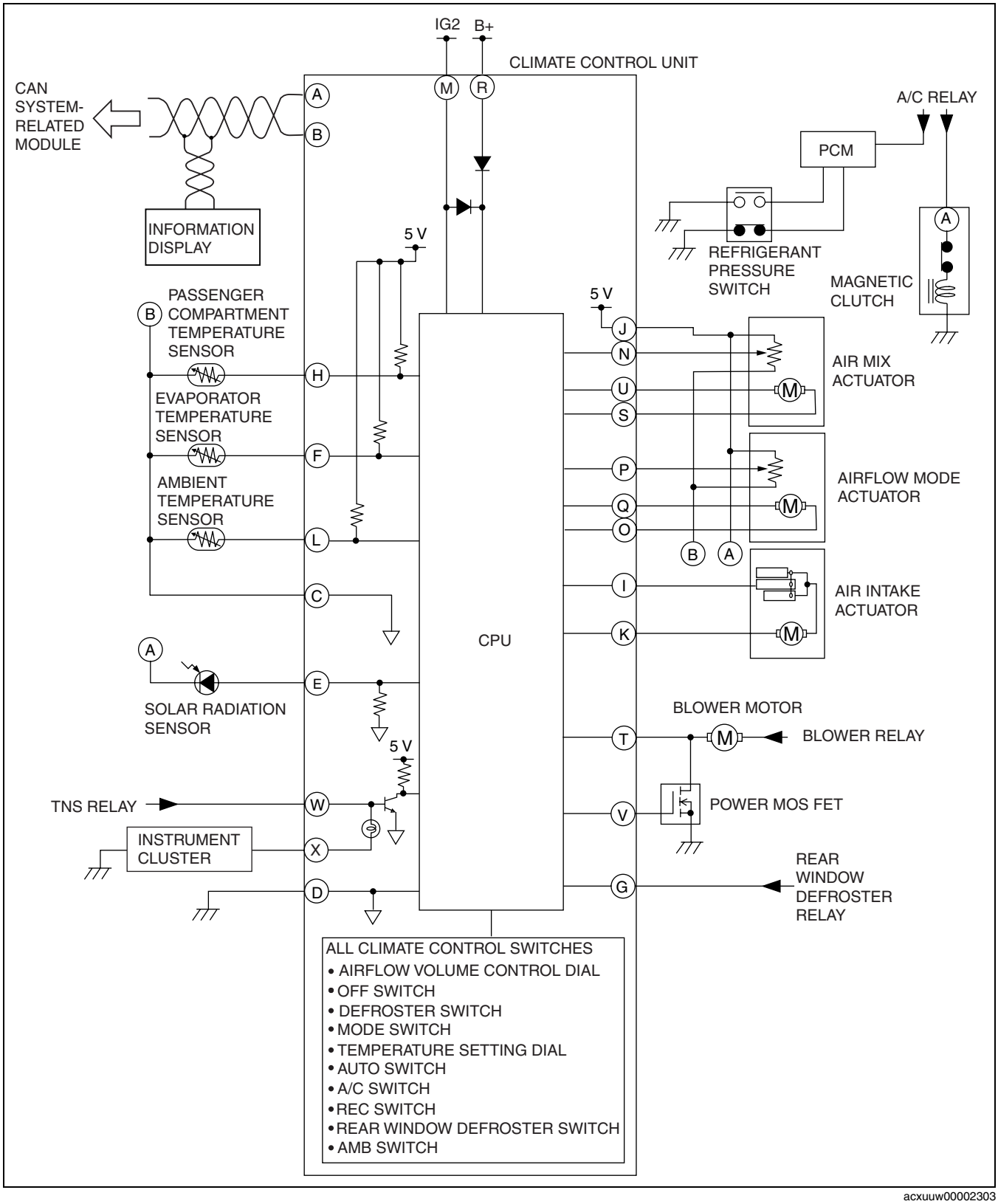
## HVAC SYSTEM WIRING DIAGRAM

id070300800100

### Full-auto Air Conditioner

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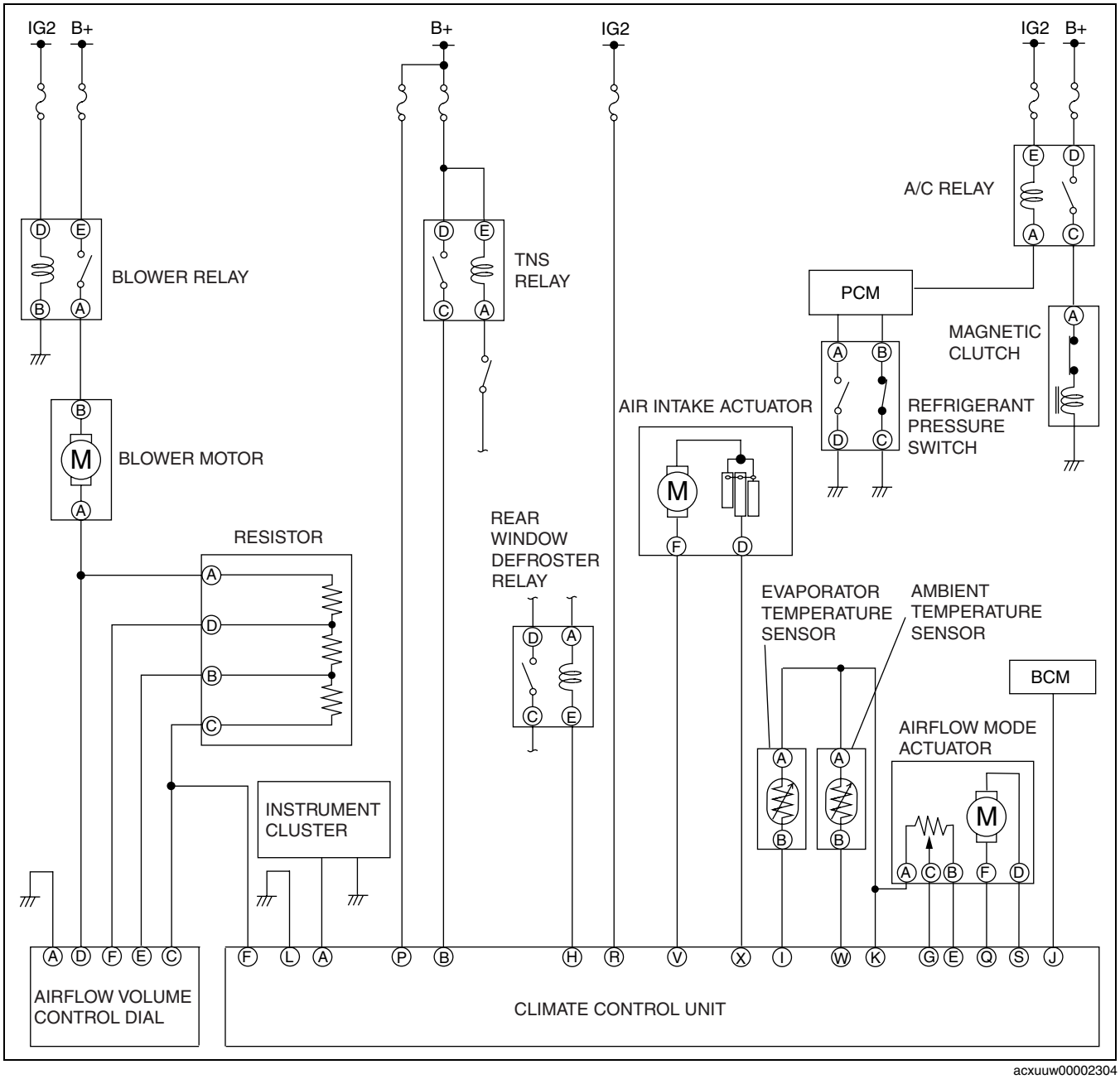
**Manual Air Conditioner**

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07-03

## FOREWORD

id070300800200

- The areas for inspection (steps) are given according to various circuit malfunctions. Use the following chart to verify the symptoms of the trouble in order to diagnose the appropriate area.

## TROUBLESHOOTING INDEX

id070300800300

| No. | TROUBLESHOOTING ITEM | DESCRIPTION |
|---|---|---|
| 1 | Insufficient air (or no air) blown from vents | • Problem with each vent and/or duct<br>• Airflow mode does not change |
| 2 | Amount of air blown from vents does not change. (Full-auto air conditioner) | • Malfunction in blower system |
| 3 | Amount of air blown from vents does not change. (Manual air conditioner) | • Malfunction in blower system |
| 4 | Air intake mode does not change. | • Air intake mode does not change when switching REC/FRESH mode. |
| 5 | No temperature control with climate control unit | • Malfunction in A/C unit and/or climate control unit air intake system |
| 6 | Windshield fogged. | • A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes.<br>• Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes. |
| 7 | Air from vents not cold enough | • Magnetic clutch operates but A/C system malfunctions. |
| 8 | No cool air | • Magnetic clutch does not operate. |
| 9 | Noise while operating A/C system | • Noise from magnetic clutch, A/C compressor, hose or refrigerant line |

## NO.1 INSUFFICIENT AIR (OR NO AIR) BLOWN FROM VENTS

id070300800400

| 1 | Insufficient air (or no air) blown from vents |
|---|---|
| DESCRIPTION | • Problem with each vent and/or duct.<br>• Airflow mode does not change. |
| POSSIBLE CAUSE | • Malfunction in airflow mode actuator<br>• Malfunction in VENT mode system<br>• Malfunction in HEAT mode system<br>• Malfunction in DEFROSTER mode system |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT AIRFLOW MODE ACTUATOR**<br>• Inspect airflow mode actuator.<br>• Is it okay? | Yes | Go to the next step. |
| | | No | Repair or replace malfunctioning part in accordance with further inspection result. |
| 2 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN VENT MODE OR OTHER MODES**<br>• Does air blow out when in the VENT mode? | Yes | Go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT VENT**<br>• Is the vent clogged? | Yes | Remove obstruction, then go to Step 9. |
| | | No | Go to the next step. |
| 4 | **VERIFY THAT DUCT IN DASHBOARD IS INSTALLED**<br>• Is the duct in the dashboard properly installed? | Yes | Inspect the duct for clogging, deformation and air leakage, then go to Step 9. |
| | | No | Install the duct securely in the proper position, then go to Step 9. |
| 5 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN HEAT MODE OR DEFROSTER MODE**<br>• Does air blow out when in the HEAT mode? | Yes | Go to the next step. |
| | | No | Inspect the vent for clogging, then go to Step 9. |
| 6 | **INSPECT DEFROSTER MODE**<br>• Does air blow out when in the DEFROSTER mode? | Yes | Operation is normal. Recheck malfunction symptoms. |
| | | No | Go to the next step. |
| 7 | **INSPECT VENT**<br>• Is the vent clogged? | Yes | Remove obstruction, then go to Step 9. |
| | | No | Go to the next step. |
| 8 | **VERIFY THAT DEFROSTER DUCT IS INSTALLED**<br>• Is the defroster duct properly installed? | Yes | Inspect the duct for clogging, deformation, and air leakage, then go to the next step. |
| | | No | Install the duct securely in proper position, then go to the next step. |
| 9 | **CONFIRM THAT MALFUNCTION SYMPTOM DOES NOT RECUR AFTER REPAIR**<br>• Does air blow out? | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |

## NO.2 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE

id070300800500

### Full-auto Air Conditioner

| 2 | Amount of air blown from vents does not change. |
|---|---|
| DESCRIPTION | • Malfunction in blower system |
| POSSIBLE CAUSE | • A/C unit malfunction<br>• Blower motor malfunction<br>• Malfunction in power MOS FET system<br>• Climate control unit malfunction |

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, inspect make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT HEATER BLOWER 40 A FUSE**<br>• Inspect the HEATER BLOWER 40 A fuse.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the fuse, then go to Step 15. If the fuse burns out immediately, go to the next step. |
| 2 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C UNIT OR ELSEWHERE**<br>• Turn the ignition switch to the ON position.<br>• Turn the airflow volume control dial to ON position.<br>• Recirculate air inside the vehicle.<br>• Does the blower motor rotate smoothly? | Yes | Go to Step 4. |
| | | No | Go to the next step. |
| 3 | **INSPECT A/C UNIT INTAKE VENT**<br>• Is A/C unit intake vent clogged? | Yes | Remove obstruction, then go to Step 15. |
| | | No | Inspect if there are any obstruction in the A/C unit passage, then go to Step 15. |
| 4* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN BLOWER RELAY SYSTEM OR POWER MOS FET SYSTEM**<br>• Turn the ignition switch to ON position.<br>• Turn the airflow volume control dial to OFF position.<br>• Measure the voltage at the following blower motor terminal.<br>— Terminal A (blower motor operation signal)<br>• Is voltage **approx. 12 V?** | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 5* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN FUSE BLOCK AND BLOWER RELAY) OR ELSEWHERE**<br>• Measure the voltage at the following blower relay terminals.<br>— Terminal B (IG2 signal)<br>— Terminal A (B+ signal)<br>• Is the voltage **approx. 12 V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the blower relay and HEATER BLOWER 40 A fuse, then go to Step 15. |
| 6* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER RELAY AND GROUND) OR ELSEWHERE**<br>• Measure the voltage at the following blower relay terminal.<br>— Terminal D (GND signal)<br>• Is the voltage **approx. 0 V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the blower relay and ground, then go to Step 15. |
| 7* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER RELAY AND BLOWER MOTOR) OR BLOWER RELAY**<br>• Measure the voltage at the following blower relay terminal.<br>— Terminal C (blower motor operation signal)<br>• Is the voltage **approx. 12 V?** | Yes | Repair the wiring harness between the blower relay and blower motor, then go to Step 15. |
| | | No | Replace the blower relay, then go to Step 15. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN BLOWER MOTOR OR ELSEWHERE**<br>• Measure the voltage at the following blower motor terminal.<br>— Terminal A (blower motor operation signal)<br>• Is the voltage **approx. 12 V?** | Yes | Go to the next step. |
| | | No | Inspect the blower motor, then go to Step 15. |
| 9* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN BLOWER MOTOR AND POWER MOS FET) OR ELSEWHERE**<br>• Measure the voltage at the following terminal of power MOS FET.<br>— Terminal E (blower motor operation signal)<br>• Is voltage **approx. 12 V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the blower motor and power MOS FET, then go to Step 15. |
| 10* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN POWER MOS FET AND GROUND) OR ELSEWHERE**<br>• Measure the voltage at the following power MOS FET terminal.<br>— Terminal A (blower motor operation signal)<br>• Is the voltage **approx. 0 V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the power MOS FET and ground, then go to Step 15. |
| 11 | **INSPECT A/C UNIT**<br>• Inspect the fan in A/C unit.<br>— Is the fan free of interference with the A/C unit case?<br>— Is the fan free of foreign material and obstruction?<br>• Is the fan normal? | Yes | Go to the next step. |
| | | No | Remove obstruction, repair or replace the fan and A/C unit case, then go to Step 15. |
| 12* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN POWER MOS FET OR ELSEWHERE**<br>• Disconnect power MOS FET connector.<br>• Turn the airflow volume control dial to 1st position from OFF.<br>• Measure the voltage at the following power MOS FET terminal.<br>— Terminal B (blower motor control signal)<br>• Is voltage **approx. 10 V?** | Yes | Replace the power MOS FET, then go to Step 15. |
| | | No | Go to the next step. |
| 13* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (LACK OF CONTINUITY BETWEEN POWER MOS FET AND CLIMATE CONTROL UNIT) OR ELSEWHERE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect climate control unit connector.<br>• Inspect for continuity at the following terminals between the power MOS FET and climate control unit.<br>— Terminal B— T (blower motor control signal)<br>— Terminal E— V (blower motor feedback signal)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the power MOS FET and climate control unit, then go to Step 15. |
| 14* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR WIRING HARNESS (SHORT TO GROUND IN WIRING HARNESS BETWEEN POWER MOS FET AND CLIMATE CONTROL UNIT)**<br>• Inspect for continuity at the following terminal between the power MOS FET and ground.<br>— Terminal A (blower motor control signal)— ground<br>• Is there continuity? | Yes | Repair the wiring harness between the power MOS FET and ground, then go to the next step. |
| | | No | Replace the climate control unit, then go to the next step. |
| 15 | **CONFIRM THAT MALFUNCTION SYMPTOM DOES NOT RECUR AFTER REPAIR**<br>• Is air discharged from vent? | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |

## NO.3 AMOUNT OF AIR BLOWN FROM VENTS DOES NOT CHANGE

id070300800600

### Manual Air Conditioner

| 3 | **Amount of air blown from vents does not change.** |
|---|---|
| **DESCRIPTION** | • Malfunction in blower system |
| **POSSIBLE CAUSE** | • Blower relay, blower motor, resistor, airflow volume control dial malfunction<br>• A/C unit malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT BLOWER SYSTEM**<br>• Inspect the following systems and electrical parts.<br>— Blower relay<br>— Blower motor<br>— Resistor<br>— Airflow volume control dial<br>— Related wiring harnesses<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Repair or replace the malfunctioning part, then go to Step 5. |
| 2 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C UNIT OR ELSEWHERE**<br>• Turn the ignition switch to the ON position.<br>• Turn the airflow volume control dial on.<br>• Recirculate air inside the vehicle.<br>• Does the blower motor rotate smoothly? | Yes | Go to Step 4. |
| | | No | Go to the next step. |
| 3 | **INSPECT A/C UNIT**<br>• Inspect blower motor.<br>— Is the fan free of interference from the A/C unit case?<br>— Is the fan free of foreign material and obstructions?<br>• Is the fan normal? | Yes | Go to the next step. |
| | | No | Remove obstruction, repair or replace the fan and A/C unit case, then go to Step 5. |
| 4 | **INSPECT A/C UNIT INTAKE VENT**<br>• Is the A/C unit intake vent clogged? | Yes | Remove obstruction, then go to the next step. |
| | | No | Inspect if there are any obstructions in the A/C unit passage, then go to the next step. |
| 5 | **VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR**<br>• Does air blow out? | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |

## NO.4 AIR INTAKE MODE DOES NOT CHANGE

id070300800700

| 4 | **Air intake mode does not change.** |
|---|---|
| **DESCRIPTION** | • Air intake mode does not change when switching REC/FRESH mode. |
| **POSSIBLE CAUSE** | • Air intake actuator malfunction<br>• Air intake door malfunction |

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, inspect to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1* | **INSPECT AIR INTAKE ACTUATOR**<br>(Auto A/C)<br>• Inspect the following items using M-MDS simulation function.<br>— MIX_ACT (Air intake actuator)<br>• Is it okay?<br>(Manual A/C)<br>• Inspect air intake actuator.<br>• Is it okay? | Yes | Go to the next step. |
| | | No | Replace the air intake actuator, then go to Step 9. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2* | **INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN AIR INTAKE ACTUATOR, WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE**<br>• Turn the ignition switch to the ON position.<br>• Measure the voltages at the following climate control unit terminals.<br>(Auto A/C)<br>— Terminal K (24-pin, FRESH motor drive signal)<br>— Terminal I (24-pin, RECIRCULATE motor drive signal)<br>(See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)<br>(Manual A/C)<br>— Terminal X (24-pin, FRESH motor drive signal)<br>— Terminal V (24-pin, RECIRCULATE motor drive signal)<br>• Are voltages normal? | Yes | Go to the next step. |
| | | No | Go to Step 4. |
| 3* | **INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN AIR INTAKE ACTUATOR OR WIRING HARNESS (BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR)**<br>• Measure the voltages at the following air intake actuator terminals.<br>(Auto A/C / Manual A/C)<br>— Terminal D (FRESH motor drive signal)<br>— Terminal F (RECIRCULATE motor drive signal)<br>• Are voltages as shown below?<br>(Auto A/C / Manual A/C)<br>— Terminal D: **approx. 0.5 V** during RECIRCULATE and **approx. 10 V** during FRESH<br>— Terminal F: **approx. 10 V** during RECIRCULATE and **approx. 0.5 V** during FRESH | Yes | Go to Step 7. |
| | | No | Repair the wiring harness between the climate control unit and air intake actuator, then go to Step 9. |
| 4 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN AIR INTAKE ACTUATOR OR ELSEWHERE**<br>• Disconnect the air intake actuator connector.<br>• Measure the voltages at the following climate control unit terminals.<br>(Auto A/C)<br>— Terminal K (FRESH motor drive signal)<br>— Terminal I (RECIRCULATE motor drive signal)<br>(See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)<br>(Manual A/C)<br>— Terminal X (FRESH motor drive signal)<br>— Terminal V (RECIRCULATE motor drive signal)<br>• Are voltages normal? | Yes | Inspect the air intake actuator, then go to Step 9. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO B+ BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE**<br>• Disconnect the climate control unit connector.<br>• Measure the voltages at the following climate control unit terminals.<br>(Auto A/C)<br>— Terminal K (FRESH motor drive signal)<br>— Terminal I (RECIRCULATE motor drive signal)<br>(Manual A/C)<br>— Terminal X (FRESH motor drive signal)<br>— Terminal V (RECIRCULATE motor drive signal)<br>• Are voltages **approx. 0 V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the climate control unit and air intake actuator, then go to Step 9. |
| 6 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (SHORT TO GROUND BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR) OR ELSEWHERE**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect for continuity at the following terminals between the climate control unit and ground.<br>(Auto A/C)<br>— Terminal K (FRESH motor drive signal)<br>— Terminal I (RECIRCULATE motor drive signal)<br>(Manual A/C)<br>— Terminal X (FRESH motor drive signal)<br>— Terminal V (RECIRCULATE motor drive signal)<br>• Is there continuity? | Yes | Repair the wiring harness between the climate control unit and air intake actuator, then go to Step 9. |
| | | No | Go to the next step. |
| 7 | **INSPECT AIR INTAKE LINK**<br>• Inspect the air intake links.<br>— Is there grease on link?<br>— Are the links securely and properly installed?<br>— Are the links free of obstructions and hindrances?<br>• Are the above items normal? | Yes | Go to the next step. |
| | | No | Apply grease to the links. If any the links are damaged, replace the air intake actuator, then go to Step 9. |
| 8 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN CLIMATE CONTROL UNIT OR AIR INTAKE DOOR**<br>• Inspect the A/C unit air intake door.<br>— Is the door free of obstructions, cracks, and damage?<br>— Are the doors securely and properly installed?<br>• Are the above items normal? | Yes | Replace the climate control unit, then go to the next step. |
| | | No | Remove obstruction, or install the doors in the proper position. If any doors are cracked or damaged, replace them, then go to the next step. |
| 9 | **CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR**<br>• Does the air intake mode change smoothly? | Yes | Troubleshooting completed. Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |

## NO.5 NO TEMPERATURE CONTROL WITH CLIMATE CONTROL UNIT

id070300800800

| 5 | No temperature control with climate control unit |
|---|---|
| DESCRIPTION | • Malfunction in A/C unit and/or climate control unit air intake system |
| POSSIBLE CAUSE | • A/C unit air intake link, air intake crank, air intake rod, air intake wire, wire clamp malfunction<br>• Climate control unit rack-and-pinion, air intake wire malfunction<br>• A/C unit air intake door malfunction<br>• Heater piping malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COOLANT TEMPERATURE**<br>• Is the coolant sufficiently warmed up? | Yes | Go to the next step. |
| | | No | Warm up the engine, then go to Step 8. |
| 2 | **INSPECT A/C UNIT AIR INTAKE SYSTEM**<br>• Inspect the A/C unit air intake links, air intake cranks, air intake rods, air intake actuator, and wire clamp.<br>— Is there grease on links and cranks?<br>— Are links, cranks, and rods securely installed in their proper positions?<br>— Is wire clamp free of deformation?<br>• Are the above items normal? | Yes | Go to the next step. |
| | | No | Apply grease or install the links, cranks, and rods securely in their proper positions, repair or replace the air intake actuator or wire clamp, then go to Step 8. |
| 3 | **VERIFY THAT AIR INTAKE WIRE FROM A/C UNIT IS POSITIONED SECURELY AND CORRECTLY (IF AVAILABLE)**<br>• Is the air intake wire securely installed in the correct position in relation to the A/C unit air mix links? | Yes | Go to the next step. |
| | | No | Adjust the air intake wire or install securely in the correct position, then go to Step 8. |
| 4 | **INSPECT CLIMATE CONTROL UNIT**<br>• Inspect the climate control unit.<br>• Is the climate control unit normal? | Yes | Go to the next step. |
| | | No | Repair or replace the climate control unit, then go to Step 8. |
| 5 | **INSPECT A/C UNIT**<br>• Is there any foreign material or obstruction in the A/C unit air intake doors? | Yes | Remove obstruction, then go to Step 8. |
| | | No | Go to the next step. |
| 6 | **INSPECT A/C UNIT AIR INTAKE DOOR**<br>• Is the A/C unit air intake door securely and properly installed? | Yes | Inspect the air intake door for cracks or damage, then go to the next step. |
| | | No | Install the air intake door securely in the proper position, then go to the next step. |
| 7 | **INSPECT HEATER LINE**<br>• Inspect the heater lines.<br>— Is the heater piping free of damage and cracks?<br>— Are the heater piping connections free of engine coolant leakage?<br>— Are the heater piping connections securely tightened?<br>— Are the heater piping installation points on A/C unit free of engine coolant leakage?<br>• Are the above items normal? | Yes | Operation is normal. Recheck malfunction symptoms. |
| | | No | If heater piping connections are loose, tighten the connections to the specified torque.<br>Repair or replace the heater piping, then go to the next step. |
| 8 | **VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR**<br>• Does the unit operate in every temperature setting? | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |

## NO.6 WINDSHIELD FOGGED

id070300800900

| 6 | Windshield fogged. |
|---|---|
| DESCRIPTION | • A/C compressor does not operate while airflow mode is in DEFROSTER or HEAT/DEF modes.<br>• Air intake mode does not change to FRESH while airflow mode is in DEFROSTER or HEAT/DEF modes. |
| POSSIBLE CAUSE | • Climate control unit (B+ signal) system malfunction<br>• Air intake actuator malfunction<br>• Climate control unit (RECIRCULATE, FRESH signal) system malfunction<br>• A/C unit air intake door malfunction |

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while doing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, inspect to make sure connectors, terminals and wiring harness are connected correctly and undamaged.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **COOL AIR BLOW OUT INSPECTION**<br>• When both the A/C and airflow volume control dial in the climate control unit are on, does cool air blow out from the front vent? | Yes | Go to the next step. |
| | | No | Go to Step 1 of troubleshooting index No.8. |
| 2 | **INSPECT CLIMATE CONTROL UNIT POWER SUPPLY FUSE FOR B+ SIGNAL**<br>• Is the climate control unit power supply fuse for B+ signal normal? | Yes | Go to the next step. |
| | | No | Inspect for a short to ground on blown fuse circuit. Repair or replace if necessary. Install appropriate amperage fuse. |
| 3 | **INSPECT AIR INTAKE ACTUATOR**<br>• Inspect the air intake actuator.<br>— Is there grease on the link?<br>— Is the link securely and properly positioned?<br>— Is the link free of obstructions?<br>• Are the above items normal? | Yes | Go to the next step. |
| | | No | Apply grease or install the link properly and securely, remove obstruction, then go to Step 14. |
| *4 | **INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND CLIMATE CONTROL UNIT FOR CONTINUITY**<br>• Disconnect the climate control unit connector (24-pin).<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at the following climate control unit terminal (B+ signal).<br>— R (full-auto air conditioner)<br>— P (manual air conditioner)<br>• Is the voltage **approx. 12 V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the fuse block and climate control unit, then go to Step 14. |
| *5 | **INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND GROUND FOR VOLTAGE**<br>• Measure the voltage at the following climate control unit terminal (Ground).<br>— D (full-auto air conditioner)<br>— L (manual air conditioner)<br>• Is the voltage **approx. 0V?** | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the climate control unit and ground, then go to Step 14. |
| 6 | **VERIFY WHETHER MALFUNCTION IS IN A/C UNIT AIR INTAKE DOOR OR ELSEWHERE**<br>• Turn the ignition switch to the LOCK position.<br>• Connect the climate control unit connector (24-pin).<br>• Remove the air intake actuator.<br>• Turn the ignition switch to the ON position.<br>• Set the airflow volume control dial to 4th position.<br>• Does the air intake mode (RECIRCULATE, FRESH) change smoothly when the air intake link is operated by hand? | Yes | Go to the next step. |
| | | No | Go to Step 12. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT AIR INTAKE ACTUATOR**<br>• Inspect the air intake actuator. (See 07-40-10 AIR INTAKE ACTUATOR INSPECTION.)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the air intake actuator, go to Step 14. |
| 8 | **INSPECT AIR INTAKE SELECTOR SWITCH AND DEFROSTER SWITCH IN CLIMATE CONTROL UNIT**<br>(Auto A/C)<br>• Measure the voltage at climate control unit connector (24-pin) terminals K and I.<br>(Manual A/C)<br>• Measure the voltage at climate control unit connector (24-pin) terminals X and V.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Replace the climate control unit, then go to Step 14. |
| *9 | **INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR CONTINUITY**<br>• Turn the ignition switch to the LOCK position.<br>• Is there continuity between the following climate control unit terminals and air intake actuator terminals?<br>(Auto A/C)<br>— Terminal D — Terminal K (FRESH signal)<br>— Terminal F — Terminal I (RECIRCULATE signal)<br>(Manual A/C)<br>— Terminal D — Terminal X (FRESH signal)<br>— Terminal F — Terminal V (RECIRCULATE signal) | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the climate control unit and air intake actuator, then go to Step 14. |
| *10 | **INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO GROUND**<br>• Is there continuity between the following climate control unit terminals and ground?<br>(Auto A/C)<br>— Terminal K (FRESH signal)<br>— Terminal I (RECIRCULATE signal)<br>(Manual A/C)<br>— Terminal X (FRESH signal)<br>— Terminal V (RECIRCULATE signal) | Yes | Repair the wiring harness between the climate control unit and air intake actuator, then go to Step 14. |
| | | No | Go to the next step. |
| *11 | **INSPECT WIRING HARNESS BETWEEN CLIMATE CONTROL UNIT AND AIR INTAKE ACTUATOR FOR SHORT TO B+**<br>• Turn the ignition switch to the ON position<br>• Measure the voltage at the following climate control unit terminals.<br>(Auto A/C)<br>— Terminal K (FRESH signal)<br>— Terminal I (RECIRCULATE signal)<br>(Manual A/C)<br>— Terminal X (FRESH signal)<br>— Terminal V (RECIRCULATE signal)<br>• Is the voltage **approx. 12 V?** | Yes | Repair the wiring harness between the climate control unit and air intake actuator, then go to Step 14. |
| | | No | Replace the climate control unit, then go to Step 14. |
| 12 | **INSPECT A/C UNIT AIR INTAKE DOOR**<br>• Is there any foreign material or obstruction in the A/C unit air intake door? | Yes | Remove obstruction, then go to Step 14. |
| | | No | Go to the next step. |
| 13 | **VERIFY THAT A/C UNIT AIR INTAKE DOOR IS POSITIONED SECURELY AND PROPERLY**<br>• Is the A/C unit air intake door securely and properly positioned? | Yes | Inspect the air intake door for cracks or damage, then go to the next step. |
| | | No | Install the air intake door securely in the proper position, then go to the next step. |
| 14 | **VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR**<br>• Does the malfunction disappear? | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |

## NO.7 AIR FROM VENTS NOT COLD ENOUGH

id070300801000

| 7 | **Air from vents not cold enough.** |
|---|---|
| **DESCRIPTION** | • Magnetic clutch operates but A/C system malfunctions. |
| **POSSIBLE CAUSE** | • Drive belt malfunction<br>• A/C unit or condenser malfunction<br>• Receiver/drier or expansion valve malfunction (valve closes too much)<br>• Malfunction in refrigerant lines<br>• A/C compressor system malfunction, insufficient compressor oil<br>• Over filling of compressor oil, malfunction in expansion valve or A/C unit air mix link system |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVE BELT**<br>• Inspect the drive belt. (See 01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Adjust or replace the drive belt, then go to Step 20. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].) |
| 2 | **INSPECT REFRIGERANT SYSTEM PERFORMANCE**<br>• Perform refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)<br>• Is the operation normal? | Yes | Operation is normal. (Recheck malfunction symptoms.) |
| | | No | Go to the next step. |
| 3 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C UNIT INTAKE AND CONDENSER OR ELSEWHERE**<br>• Are the refrigerant high-pressure and low-pressure values both high? | Yes | Go to the next step. |
| | | No | Go to Step 6. |
| 4 | **INSPECT A/C UNIT INTAKE**<br>• Is the A/C unit intake clogged? | Yes | Remove obstruction, then go to Step 20. (If air does not reach the evaporator in the A/C unit, heat exchange does not occur and refrigerant pressure becomes high. Therefore, removal of obstruction is necessary.) |
| | | No | Go to the next step. |
| 5 | **INSPECT CONDENSER**<br>• Inspect the condenser. (See 07-11-18 CONDENSER INSPECTION.)<br>• Is it normal? | Yes | Adjust refrigerant to the specified amount, then go to Step 20. (Excessive amount of refrigerant.) |
| | | No | Replace the condenser, or repair and clean the condenser fins, then go to Step 20. |
| 6 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE, RECEIVER/DRIER AND REFRIGERANT LINES OR ELSEWHERE**<br>• Are the refrigerant high-pressure and low-pressure values low? | Yes | Go to the next step. |
| | | No | Go to Step 14. |
| 7 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE AND RECEIVER/ DRIER OR ELSEWHERE**<br>• Immediately after the A/C compressor operates, does the refrigerant high-pressure value momentarily rise to correct value, then fall and stay below it? (Is there negative pressure on low-pressure side?) | Yes | Go to the next step. |
| | | No | Go to Step 10. |
| 8 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE OR RECEIVER/ DRIER**<br>• Turn the A/C switch off and let the air conditioner stop for **10 min.**<br>• Start the engine.<br>• Turn the both A/C switch and airflow volume control dial on.<br>• Does the malfunction occur after the A/C compressor turns on? | Yes | Go to the next step. |
| | | No | Replace the condenser and vacuum the refrigerant line **more than 30 min** by the vacuum pump, add refrigerant to the specified level, then go to Step 20. (Since water has intermixed in the receiver/drier and it is saturated, replacement is necessary.) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | **VERIFY THAT EXPANSION VALVE HEAT-SENSING TUBE WITHIN A/C UNIT IS POSITIONED SECURELY AND CORRECTLY**<br>• Is the expansion valve heat-sensing tube in the A/C unit securely installed in the proper position? | Yes | Replace the expansion valve, then go to Step 20. (Since the valve closes too much, replacement is necessary.) |
| | | No | Install the heat-sensing tube securely in the proper position, then go to Step 20. |
| 10 | **INSPECT REFRIGERANT LINE**<br>• Inspect the refrigerant lines.<br>— Is the piping free of damage and cracks?<br>— Are the piping connections free of oil grime? (Visual inspection)<br>— Are the piping connections free of gas leakage?<br>— Are the piping installation points on the condenser free of gas leakage?<br>— Are the piping installation points on the receiver/drier free of gas leakage?<br>— Are the piping installation points on the A/C compressor free of gas leakage?<br>— Are the piping installation points on the A/C unit free of gas leakage?<br>— Perform gas leakage inspection using a gas leak tester.<br>• Are the above items normal? | Yes | Go to the next step. |
| | | No | If the piping or A/C component (s) are damaged or cracked, replace them.<br>Then go to Step 20.<br>If there is no damage, go to Step 13. |
| 11 | **INSPECT EVAPORATOR PIPING CONNECTION IN A/C UNIT FOR GAS LEAKAGE**<br>• Are piping the connections for the evaporator in the A/C unit free of gas leakage? | Yes | If the vane makes a noise, add **10 ml {10 cc, 0.34 fl oz}** of compressor oil to the A/C compressor. Verify that the noise is no longer heard.<br>Adjust refrigerant to the specified amount, then go to Step 20. |
| | | No | If the piping is damaged or cracked, replace it.<br>Then go to Step 20.<br>If there is no damage, go to the next step. |
| 12 | **INSPECT EVAPORATOR PIPING CONNECTION IN A/C UNIT FOR LOOSE**<br>• Are the piping connections for the evaporator in the A/C unit loose? | Yes | Tighten the connections to the specified torque, adjust both compressor oil and refrigerant to the specified amount, then go to Step 20. |
| | | No | If the vane makes a noise, add **10 ml {10 cc, 0.34 fl oz}** of compressor oil to the A/C compressor. Verify that the noise is no longer heard.<br>Replace the O-ring on piping, adjust refrigerant to the specified amount, then go to Step 20. |
| 13 | **INSPECT PIPING CONNECTION FOR LOOSE**<br>• Are the piping connections loose? | Yes | Tighten the connections to the specified torque, adjust both compressor oil and refrigerant to the specified amount, then go to Step 20. |
| | | No | If the vane makes a noise, add **10 ml {10 cc, 0.34 fl oz}** of compressor oil to the A/C compressor. Verify that the noise is no longer heard.<br>Replace O-ring on piping, adjust refrigerant to specified amount, then go to Step 20. |
| 14 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE, AIR MIX ACTUATOR AND COMPRESSOR OIL OR ELSEWHERE**<br>• Does the refrigerant high-pressure value hardly increase? | Yes | Go to the next step. (Pressure hardly increases.) |
| | | No | Go to Step 17. |
| 15 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL AMOUNT AND A/C COMPRESSOR OR ELSEWHERE**<br>• When the engine is racing, does the high-pressure value increase? | Yes | Return to Step 3. |
| | | No | Go to the next step. |
| 16 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL AMOUNT OR A/C COMPRESSOR**<br>• After compressor oil is replenished each **10 ml {10 cc, 0.34 fl oz}**, does high-pressure value increase? | Yes | Troubleshooting completed. (Explain to customer that cause was insufficient compressor oil.) |
| | | No | Replace the A/C compressor, then go to Step 20. (Cause is defective A/C compressor.) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 17 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN EXPANSION VALVE OR ELSEWHERE**<br>• Is only refrigerant low-pressure value high? | Yes | Go to Step 19. |
| | | No | Go to the next step. |
| 18 | **VERIFY THAT AIR MIX IS INSTALLED SECURELY AND PROPERLY**<br>• Are the A/C unit air mix links, air mix cranks, and air mix rods securely and properly installed? | Yes | Set the airflow volume control dial to 4th position.<br>Turn the A/C switch on.<br>Set FRESH mode.<br>Set temperature control to MAX COLD.<br>Set VENT mode.<br>(1)Start and run the engine at **1,500 rpm for 10 min.**<br>(2)Run the engine at idle for **1 min.**<br>(3)Within **12 s**, idle → **4,000 rpm** → idle. Perform cycle **5 times**.<br>(4) Run the engine at idle for **30 s**.<br>(5)Drain the compressor oil completely from the A/C compressor and verify the amount.<br>• If there is **approx. 90 ml {90 cc, 3.0 fl oz}** of compressor oil, go to Step 20.<br>• If there is **more than 90 ml {90 cc, 3.0 fl oz}** of compressor oil, remove surplus oil and fill the A/C compressor with **90 ml {90 cc, 3.0 fl oz}** of compressor oil. Repeat Steps (1) to (5).<br>(Cause is excessive amount of compressor oil.) |
| | | No | Repair or install the links, cranks and rods securely in the proper position, then go to Step 20. |
| 19 | **VERIFY THAT EXPANSION VALVE HEAT-SENSING TUBE WITHIN A/C UNIT IS POSITIONED SECURELY AND CORRECTLY**<br>• Is the expansion valve heat-sensing tube in the A/C unit securely installed in the proper position? | Yes | Replace the expansion valve, then go to the next step. (Since the valve opens too much, replacement is necessary.) |
| | | No | Install the heat-sensing tube securely in the proper position, then go to the next step. |
| 20 | **VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR**<br>• Does cool air blow out? (Are results of refrigerant system performance test normal?) | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if the malfunction recurs. |



### NO.8 NO COOL AIR

id070300801100

| 8 | No cool air |
|---|---|
| **DESCRIPTION** | • Magnetic clutch does not operate. |
| **POSSIBLE CAUSE** | • Malfunction in PCM A/C cut control system<br>• Malfunction in climate control unit<br>• Malfunction in refrigerant pressure switch<br>• Malfunction in PCM (A/C signal)<br>• Malfunction in PCM (IG1 signal)<br>• Malfunction in A/C compressor<br>• Malfunction in A/C relay<br>• Malfunction in evaporator temperature sensor<br>• Malfunction in BCM unit (Manual A/C)<br>• Malfunction in CAN communication |

- When performing an asterisked (*) troubleshooting inspection, shake the wiring harness and connectors while performing the inspection to discover whether poor contact points are the cause of any intermittent malfunctions. If there is a problem, check to make sure connectors, terminals and wiring harnesses are connected correctly and undamaged.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT AIR BLOW OUT**<br>• Does air blow out? | Yes | Go to the next step. |
| | | No | Go to Step 1 of troubleshooting indexes No.1 and 2. |
| 2 | **INSPECT A/C COMPRESSOR OPERATION**<br>• Start engine.<br>• Turn A/C switch and airflow volume control dial on.<br>• Does A/C compressor operate? | Yes | Go to Step 1 of troubleshooting index No.7. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT FOR DTC IN PCM**<br>• Inspect for DTCs related to the PCM on-board diagnostic system.<br>• Are any DTCs displayed? | Yes | Go to appropriate inspection procedure. |
| | | No | (Auto A/C)<br>Go to the next step.<br>(Manual A/C)<br>Go to Step 5. |
| 4 | **CONFIRM DTC U0073, U0516 USING M-MDS**<br>• Retrieve DTC from EATC and HEC.<br>• DTCs (U0073, U0516) retrieved? | Yes | Network communication, for related system is malfunction.<br>Go to appropriate inspection procedure. |
| | | No | Go to Step 6. |
| 5 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN PCM OR ELSEWHERE**<br>• Does cool air blow out when terminal 1AU of PCM connector (A/C signal) is grounded? | Yes | Inspect and/or replace the PCM, then go to Step 18. |
| | | No | Release short, then go to the next step. |
| 6* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C SIGNAL CIRCUIT (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR ELSEWHERE**<br>• Test voltage at following terminal of refrigerant pressure switch.<br>— Terminal B (A/C signal)<br>• Is voltage **approx. 12 V?** | Yes | Go to Step 8. |
| | | No | Go to the next step. |
| 7* | **INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN WIRING HARNESS (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR PCM**<br>• Test voltage at A/C signal terminal of PCM.<br>• Is voltage **approx. 12 V?** | Yes | Repair wiring harness between PCM and refrigerant pressure switch, then go to Step 18. |
| | | No | Inspect PCM, then go to Step 18. |
| 8 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH, REFRIGERANT AMOUNT, OR ELSEWHERE**<br>• Does cool air blow out when terminals A and B of refrigerant pressure switch connector are shorted? | Yes | Go to Step 10. |
| | | No | (Auto A/C)<br>Go to Step 11.<br>(Manual A/C)<br>Go to the next step. |
| 9* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN REFRIGERANT PRESSURE SWITCH AND PCM) OR ELSEWHERE**<br>• Test voltage at following terminal of PCM.<br>— Terminal 1AU (A/C signal)<br>• Is voltage **approx. 12 V?** | Yes | Go to Step 11. |
| | | No | Repair wiring harness between refrigerant pressure switch and PCM, then go to Step 18. |
| 10 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN REFRIGERANT PRESSURE SWITCH OR REFRIGERANT AMOUNT**<br>• Inspect refrigerant pressure switch.<br>• Is it okay? | Yes | If refrigerant amount is empty, replace condenser, vacuum refrigerant line **more than 30 min** by vacuum pump, and add refrigerant to specified level, then go to Step 18. |
| | | No | Replace refrigerant pressure switch, then go to Step 18. |
| 11 | **INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN A/C CONTROL SIGNAL CIRCUIT (BETWEEN A/C RELAY AND PCM) OR ELSEWHERE**<br>• Does cool air blow out when terminal E of A/C relay connector (A/C control signal) is grounded? | Yes | Release short, then go to the next step. |
| | | No | Go to Step 13. |
| 12* | **INSPECT TO SEE WHETHER MALFUNCTION (LACK OF CONTINUITY) IS IN PCM OR WIRING HARNESS (BETWEEN A/C RELAY AND PCM)**<br>• Test voltage at the A/C relay control signal terminal of PCM.<br>• Is voltage **approx. 12 V?** | Yes | Inspect PCM, then go to Step 18. |
| | | No | Repair wiring harness between A/C relay and PCM, then go to Step 18. |
| 13* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN MAGNETIC CLUTCH OR ELSEWHERE**<br>• Test voltage at the following terminal of magnetic clutch thermal protector.<br>— Terminal A (magnetic clutch operation signal)<br>• Is voltage **approx. 12 V?** | Yes | Inspect magnetic clutch, then go to Step 18. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 13* | **INSPECT TO SEE WHETHER MALFUNCTION IS IN MAGNETIC CLUTCH OR ELSEWHERE**<br>• Test voltage at the following terminal of magnetic clutch thermal protector.<br>— Terminal A (magnetic clutch operation signal)<br>• Is voltage **approx. 12 V?** | Yes | Inspect magnetic clutch, then go to Step 18. |
| | | No | Go to the next step. |
| 14 | **INSPECT FUSE**<br>• Are A/C relay power supply fuses okay? | Yes | Go to the next step. |
| | | No | Replace fuse, then go to Step 18. If fuse burns out immediately, go to the next step. |
| 15 | **INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND A/C RELAY FOR LACK OF CONTINUITY**<br>• Test voltages at following terminals of A/C relay.<br>— Terminal A (A/C relay control signal)<br>— Terminal C (A/C control signal)<br>• Are voltages **approx. 12 V?** | Yes | Go to the next step. |
| | | No | Repair wiring harness between fuse block and A/C relay, then go to Step 18. |
| 16 | **INSPECT TO SEE WHETHER MALFUNCTION IS IN A/C RELAY OR WIRING HARNESS (BETWEEN A/C RELAY AND MAGNETIC CLUTCH) AND EVAPORATOR TEMPERATURE SENSOR**<br>• Test voltage at the following terminal of A/C relay.<br>— Terminal D (magnetic clutch operation signal)<br>• Is voltage **approx. 12 V?** | Yes | Inspect wiring harness between A/C relay and magnetic clutch.<br>• If above wiring harness is OK, go to the next step.<br>• If above wiring harness malfunctions, repair wiring harness, then go to Step 18. |
| | | No | Replace A/C relay, then go to Step 18. |
| 17 | **INSPECT EVAPORATOR TEMPERATURE SENSOR**<br>• Inspect evaporator temperature sensor.<br>• Is it okay? | Yes | Go to the next step. |
| | | No | Replace evaporator temperature sensor, then go to the next step. |
| 18 | **CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR**<br>• Does cool air blow out? (Are the results of refrigerant system performance test okay?) | Yes | Troubleshooting completed. Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs. |



## NO.9 NOISE WHILE OPERATING A/C SYSTEM

id070300801200

| 9 | **Noise while operating A/C system.** |
|---|---|
| **DESCRIPTION** | • Noise from magnetic clutch, A/C compressor, hose or refrigerant line. |
| **POSSIBLE CAUSE** | • Magnetic clutch operation noise<br>• A/C compressor vane noise<br>• A/C compressor slippage noise<br>• Hose or refrigerant line interference noise |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **CHECK A/C COMPRESSOR VANE NOISE**<br>• Is there a jingling, popping, beeping, or buzzing sound (A/C compressor vane noise)? | Yes | Go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT A/C COMPRESSOR SLIPPAGE NOISE**<br>• Is there a squeaking or whirling sound (A/C compressor slippage noise)? | Yes | Go to Step 14. |
| | | No | Go to the next step. |
| 3 | **INSPECT A/C COMPRESSOR INTERFERENCE NOISE**<br>• Is there a rattling or vibrating sound (interference noise)? | Yes | Go to Step 18. |
| | | No | Go to the next step. |
| 4 | **INSPECT MAGNETIC CLUTCH OPERATION NOISE**<br>• Is there a clicking sound (magnetic clutch operation noise)? | Yes | Adjust clearance between pressure plate of magnetic clutch and A/C compressor pulley, then go to Step 19.<br>(See 07-40-6 MAGNETIC CLUTCH ADJUSTMENT.) |
| | | No | Condition is normal. (Recheck malfunction symptoms.) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT A/C COMPRESSOR NOISE TIME**<br>• Is noise heard continuously for **more than 3 s** after A/C compressor comes on? | Yes | Go to the next step. |
| | | No | Condition is normal. (Noise occurs for **2— 3 s** immediately after A/C compressor turns on.) |
| 6 | **INSPECT IDLE SPEED**<br>• Inspect idle speed. (See 01-10-35 ENGINE TUNE-UP[L3 WITH TC].)<br>• Is it okay? | Yes | Go to the next step. |
| | | No | Follow the repair instruction described in section 01-10, then go to Step 19. |
| 7 | **INSPECT REFRIGERANT AMOUNT**<br>• Inspect refrigerant amount.<br>• Is it okay? | Yes | Go to Step 10. |
| | | No | Go to the next step. |
| 8 | **INSPECT REFRIGERANT LINES**<br>• Inspect refrigerant lines.<br>— Is piping free of damage and cracks?<br>— Are piping connections free of oil grime? (Visual inspection)<br>— Are piping connections free of gas leakage?<br>— Are piping installation points on condenser free of gas leakage?<br>— Are piping installation points on receiver/drier free of gas leakage?<br>— Are piping installation points on A/C compressor free of gas leakage?<br>— Are piping installation points on A/C unit free of gas leakage<br>— Perform gas leak inspection using gas leak tester.<br>• Are above items okay? | Yes | Go to the next step. |
| | | No | If piping or A/C component(s) is damaged or cracked, replace then go to Step 19.<br>If there is gas leakage, repair or replace connection and replace condenser*, then go to Step 19. |
| 9 | **INSPECT EVAPORATOR PIPING CONNECTIONS IN A/C UNIT FOR GAS LEAKAGE**<br>• Are piping connections for evaporator in A/C unit free of gas leakage? | Yes | Adjust refrigerant amount to specified level, then go to Step 19. |
| | | No | If piping is damaged or cracked, replace then go to Step 19.<br>If there is gas leakage, repair or replace connection and replace condenser*, then go to Step 19. |
| 10 | **CHECK TO SEE WHETHER MALFUNCTION IS IN COMPRESSOR OIL OR ELSEWHERE**<br>• Add **20 ml {20 cc, 0.8 fl oz}** of compressor oil.<br>• Is noise heard when racing engine? | Yes | Go to the next step. |
| | | No | Troubleshooting completed.<br>Explain repair to customer. |
| 11 | **CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE**<br>• Drain compressor oil.<br>• Is it contaminated with metal particles? | Yes | Go to the next step. |
| | | No | Replace A/C compressor, then go to Step 19. |
| 12 | **CHECK TO SEE WHETHER MALFUNCTION IS SOMEWHERE IN A/C SYSTEM OR ELSEWHERE**<br>• Is compressor oil whitish and mixed with water? | Yes | Replace entire A/C system (excluding heater), then go to Step 19. |
| | | No | Go to the next step. |
| 13 | **INSPECT A/C COMPRESSOR OIL**<br>• Is compressor oil darker than normal and contaminated with aluminum chips? | Yes | Replace A/C compressor and condenser, then go to Step 19. (Since A/C compressor may be worn and receiver/drier may be clogged, replacement of receiver/drier is necessary.) |
| | | No | Condition is normal. Recheck malfunction symptoms. |
| 14 | **CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR ELSEWHERE**<br>• Is noise heard immediately after A/C compressor is stopped? | Yes | Replace A/C compressor, then go to Step 19. (A/C compressor discharge valve left open) |
| | | No | Go to the next step. |
| 15 | **INSPECT DRIVE BELT**<br>• Inspect drive belt. (See 01-10-3 DRIVE BELT INSPECTION[L3 WITH TC].)<br>• Is it okay? | Yes | Go to the next step. |
| | | No | Adjust or replace drive belt, then go to Step 19. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 16 | **INSPECT DRIVE BELT CONDITION**<br>• Is drive belt worn?<br>• Does it have foreign material imbedded in it, or have oil on it? | Yes | Remove obstruction, remove oil, or replace drive belt, then go to Step 19. |
| | | No | Go to the next step. |
| 17 | **INSPECT MAGNETIC CLUTCH**<br>• Inspect magnetic clutch. (See 07-40-7 MAGNETIC CLUTCH INSPECTION.)<br>• Is it okay? | Yes | Replace A/C compressor (excluding pressure plate, A/C compressor pulley, and stator), then go to Step 19. |
| | | No | Replace magnetic clutch, then go to Step 19. |
| 18 | **CHECK TO SEE WHETHER MALFUNCTION IS IN A/C COMPRESSOR OR REFRIGERANT LINES**<br>• Is noise emitted from A/C compressor? | Yes | Visually inspect A/C compressor, replace appropriate parts if necessary, then go to the next step. |
| | | No | If noise is due to refrigerant lines, repair detached or missing clips, tighten loose bolts, then go to the next step. |
| 19 | **VERIFY THAT MALFUNCTION SYMPTOM OCCURS AFTER REPAIR**<br>• Has A/C compressor noise stopped? | Yes | Troubleshooting completed.<br>Explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs. |

* : If there is gas leakage, air enters into the A/C system. The desiccant within the receiver/drier absorbs the moisture from the air and becomes saturated. If the A/C system is used in this condition, the inside of the A/C compressor will begin to rust due to this moisture, which may cause lock up or noise to occur. Therefore, replacement of the receiver/drier is necessary.

# 07-10 REFRIGERANT SYSTEM

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## REFRIGERANT SYSTEM SERVICE WARNINGS

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**Using/Handling Unapproved Refrigerant**

- **Using a flammable refrigerant, such as OZ-12, in this vehicle is dangerous. In an accident, the refrigerant may catch fire, resulting in serious injury or death. When servicing this vehicle, use only R-134a.**
- **Checking for system leakage on a vehicle that has been serviced with flammable refrigerant, such as OZ-12, is dangerous. Conventional leak detectors use an electronically generated arc which can ignite the refrigerant, causing serious injury or death. If a flammable refrigerant may have been used to service the system, or if you suspect a flammable refrigerant has been used, contact the local fire marshal or EPA office for information on handling the refrigerant.**

**Handling Refrigerant**

- **Avoid breathing air conditioning refrigerant or lubricant vapor. Exposure may irritate eyes, nose and throat. Also, due to environmental concerns, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) when draining R-134a from the air conditioning system. If accidental system discharge occurs, ventilate work area before resuming service.**
- **Do not pressure test or leak test R-134a service equipment and/or vehicle air conditioning system with compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures, if ignited, may cause injury or property damage. Additional health and safety information may be obtained from refrigerant manufacturers.**
- **Do not allow the refrigerant to leak near fire or any kind of heat. A poisonous gas may be generated if the refrigerant gas contacts fire or heat such as from cigarettes and heaters. When carrying out any operation that can cause refrigerant leakage, extinguish or remove the above-mentioned heat sources and maintain adequate ventilation.**
- **Handling liquid refrigerant is dangerous. A drop of it on the skin can result in localized frostbite. When handling the refrigerant, wear gloves and safety goggles. If refrigerant splashes into the eyes, immediately wash them with clean water and consult a doctor.**

**Storing Refrigerant**

- **The refrigerant container is highly pressurized. If it is subjected to high heat, it could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Store the refrigerant at temperatures below 40°C {104°F}.**

## REFRIGERANT SYSTEM SERVICE CAUTIONS

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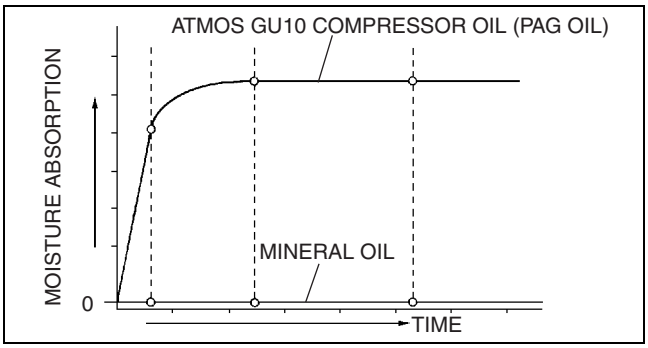
**Handling Insufficient Refrigerant Level**

- **If an insufficient refrigerant level is detected at troubleshooting, do not charge (add) the refrigerant. Because an accurate amount of refrigerant cannot be determined from the pressure indicated on the manifold gauge, never charge the refrigerant. If there is too much or too little refrigerant from the refilling, there may be secondary problems such as damage to the refrigerant cycle parts, or a decrease of cooling performance. Therefore, if it is determined that the refrigerant level is insufficient, completely remove refrigerant from the refrigerant cycle and refill with refrigerant to the specified amount.**

**Handling Compressor Oil**

- **Use only ATMOS GU10 compressor oil for this vehicle. Using a PAG oil other than ATMOS GU10 compressor oil can damage the A/C compressor.**
- **Do not spill ATMOS GU10 compressor oil on the vehicle. A drop of compressor oil on the vehicle surface can eat away at the paint. If oil gets on the vehicle, wipe it off immediately.**
- **ATMOS GU10 compressor oil (PAG oil) has a higher moisture absorption efficiency than the previously used mineral oil. If moisture mixes with the compressor oil, the refrigerant system could be damaged. Therefore, install caps immediately after using the compressor oil or removing refrigerant system parts to prevent moisture absorption.**
- **If the refrigerant gas is completely discharged from the system for reasons such as a malfunction during A/C operation, repair or replace the malfunctioning part, charge the refrigerant to the specified amount and always add 60 ml {60 cc, 2.03 fl oz} of A/C compressor. If the compressor oil is not adequately replenished, the A/C compressor may quickly deteriorate, abnormal noise may develop, cooling performance may be affected or, in the worst case, the A/C compressor may seize.**

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## REFRIGERANT SYSTEM GENERAL PROCEDURES

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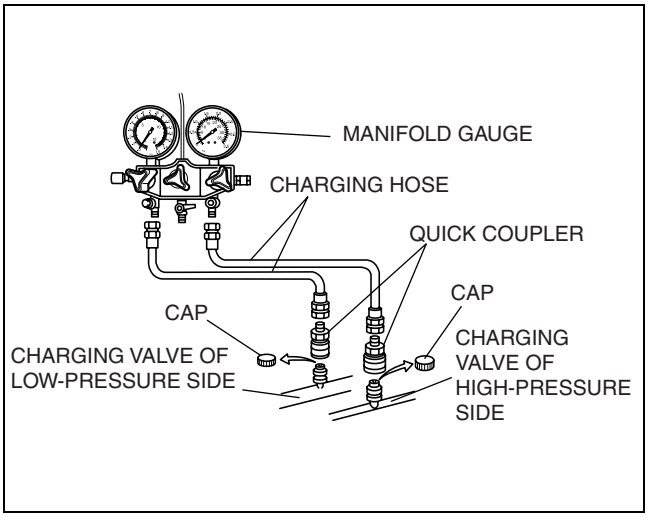
**Manifold Gauge Set Installation**

1. Fully close the valves of the manifold gauge.
2. Connect the charging hoses to the high and low-pressure side joints of the manifold gauge.
3. Connect the quick couplers to the ends of the charging hoses.
4. Connect the quick couplers to the charging valves.

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## REFRIGERANT CHARGING

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**Caution**

- **Do not exceed the specification when charging the system with refrigerant. Doing so will decrease the efficiency of the air conditioner or damage the refrigeration cycle parts.**

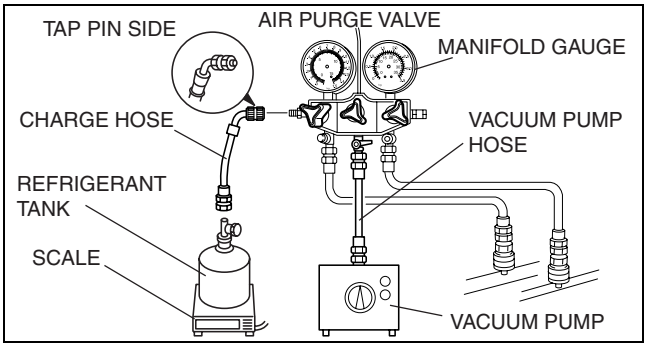
**Charging Recycled R-134a Refrigerant**

1. Connect an R-134a recovery/recycling/recharging device to the vehicle and follow the device manufacturer's instructions.

**Charging Preparation**

1. Install the manifold gauge set.
2. Connect the tap pin side of the charging hose to the air purge valve of the manifold gauge.
3. Connect the vacuum pump hose to the center joint of the manifold gauge.
4. Connect the vacuum pump hose to the vacuum pump.
5. Connect the charging hose to the refrigerant tank.
6. Place the refrigerant tank on the scale.

**Regular amount of refrigerant (approx. quantity)**
**500 g {17.7 oz}**

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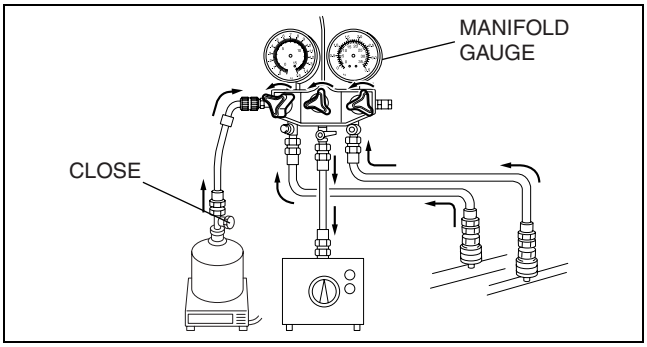
**Evacuation**

1. Open all the valves of the manifold gauge.

**Caution**

- **Close the manifold gauge valve immediately after stopping the vacuum pump. If the valve is left open, the vacuum pump oil will flow back into the refrigeration cycle and cause a decrease in the efficiency of the air conditioner.**

2. Start the vacuum pump and let it operate for **15 min.**

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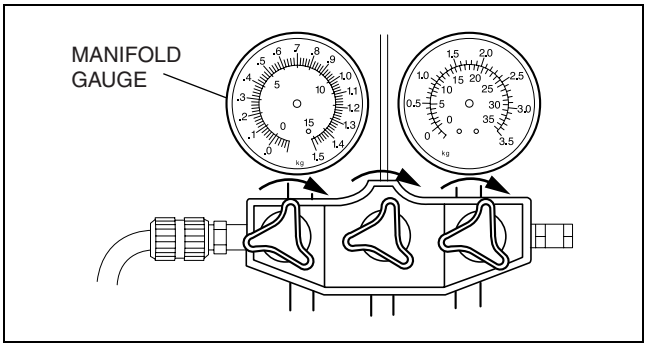
3. Verify that high- and low-pressure side readings of the manifold gauge are at **–101 kPa {–760 mmHg, –29.9 inHg}**. Close each valve of the manifold gauge.

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**Airtightness Check**

1. Stop the vacuum pump and wait for **5 min.**
2. Check the high- and low-pressure side readings of the manifold gauge.
   - If the reading has changed, inspect for leakage and go to Evacuation. (See 07-10-3 Evacuation.)
   - If the reading has not changed, go to Charging New R-134a Refrigerant. (See 07-10-4 Charging New R-134a Refrigerant.)

**Charging New R-134a Refrigerant**

1. Open the valve of the refrigerant tank.
2. Weigh the refrigerant tank to charge the suitable amount of refrigerant.

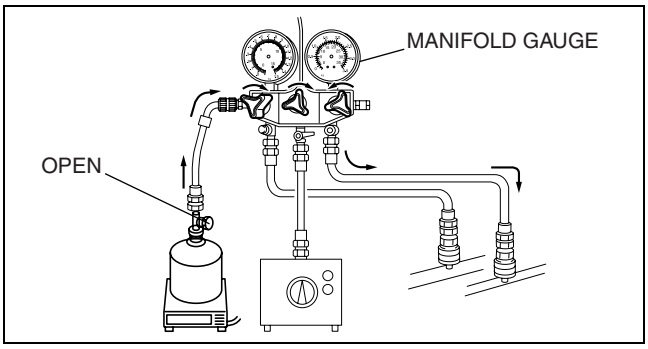
**Warning**

- **If the refrigerant system is charged with a large amount of refrigerant when inspecting for gas leakage, and if any leakage should occur, the refrigerant will be released into the atmosphere. In order to prevent the accidental release of refrigerant which can destroy the ozone layer in the stratosphere, follow the proper procedures and charge with only a small amount of refrigerant when inspecting for gas leakage.**
- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

**Caution**

- **Always being charging of refrigerant from the high-pressure side. If changing is begun from the low-pressure side, the vanes of the A/C compressor will not be released and abnormal noise may result.**

3. Open the high-pressure side valve of the manifold gauge.

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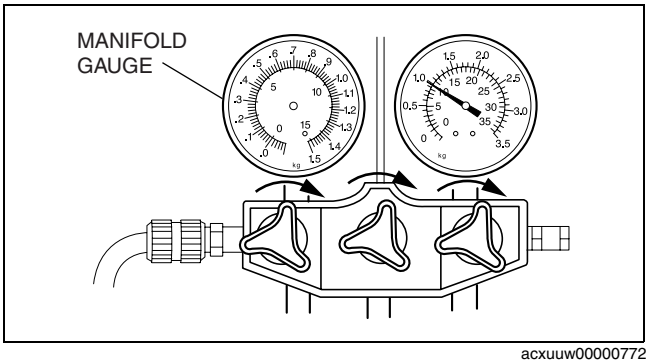
4. When the low-pressure side reading increases to **0.098 MPa {1.0 kgf/cm$^2$, 14 psi}**, close the high-pressure side valve of the manifold gauge.
5. Inspect for leakage from the cooler pipe/hose connections using a gas leak tester.
   - If there is no leakage, go to Step 7.
   - If leakage is found at a loose joint, tighten the joint, then go to the next step.
6. Inspect for leakage again.
   - If there is no leakage after tightening the joint, go to the next step.
   - If there is still a leakage at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from evacuation.

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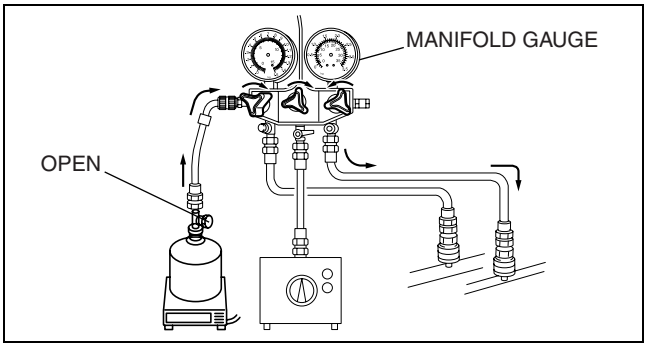
**Warning**

- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**

7. Open the high-pressure side valve of the manifold gauge and charge with refrigerant until the weight of refrigerant tank has decreased **250 g {8.83 oz}** from the amount in Step 2.



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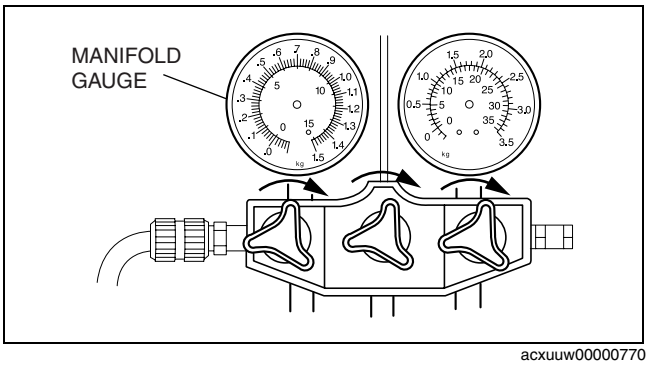
8. Close the low-pressure side valve of the manifold gauge.

**Warning**

- **If charging the system with refrigerant using service cans, running the engine with the high-pressure side valve open is dangerous. Pressure within the service cans will increase and the cans could explode, scattering metal fragments and liquid refrigerant that can seriously injure you. Therefore, do not open the high-pressure side valve while the engine is running.**



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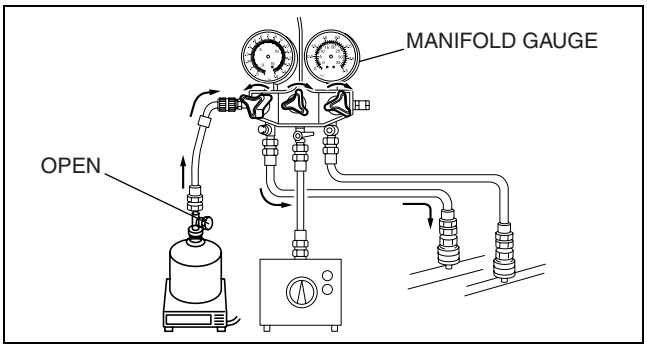
9. Start the engine and actuate the A/C compressor.
10. Open the low-pressure side valve of the manifold gauge and charge with refrigerant until the weight of the refrigerant tank has decreased regular amount from the amount in Step 2.
11. Close the low-pressure side valve of the manifold gauge and the valve of the refrigerant tank.
12. Stop the engine and A/C compressor.



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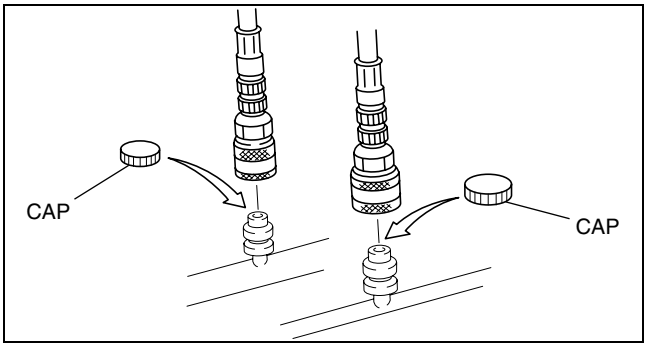
**Leak Test**

1. Inspect for leakage using the a gas leak tester.
   - If there is no leakage, go to Step 3.
   - If leakage is found at a loose joint, tighten the joint, then go to the next step.
2. Inspect for leakage again.
   - If there is no leakage after tightening the joint, go to the next step.
   - If there is still leakage at the same joint, discharge the refrigerant and then repair the joint. Repeat the charging procedure from evacuation.
3. Disconnect the manifold gauge from the charging valves.
4. Install the caps to the charging valves.



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## REFRIGERANT RECOVERY

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**Warning**

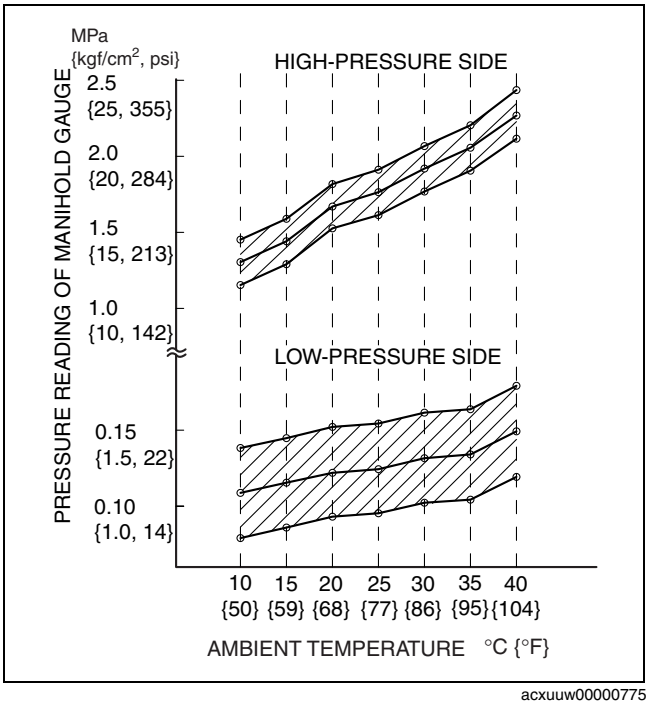
- **Avoid breathing air conditioning refrigerant or lubricant vapor. Exposure may irritate eyes, nose and throat. Also, due to environmental concerns, use service equipment certified to meet the requirements of SAE J2210 (R-134a recycling equipment) when draining R-134a from the air conditioning system. If accidental system discharge occurs, ventilate work area before resuming service.**

1. Connect an R-134a recovery/recycling/recharging device to the vehicle and follow the device manufacturer's instructions.

## REFRIGERANT PRESSURE CHECK

id071000800600

1. Connect the manifold gauge. (See 07-10-2 REFRIGERANT SYSTEM GENERAL PROCEDURES.)
2. Start the engine and after it is warmed up, run it at a constant **1,500 rpm.**
3. Set the fan speed MAX HI.
4. Turn the A/C switch on.
5. Set to RECIRCULATE mode.
6. Set the temperature control to MAX COLD.
7. Set to VENT mode.
8. Close all the doors and all the windows.
9. Measure the ambient temperature and high- and low- pressure side reading of the manifold gauge.
10. Verify that the intersection of the pressure reading of the manifold gauge and ambient temperature is in the shaded zone.
    - If there is any malfunction, inspect the refrigerant system according to the troubleshooting chart.

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## REFRIGERANT SYSTEM PERFORMANCE TEST

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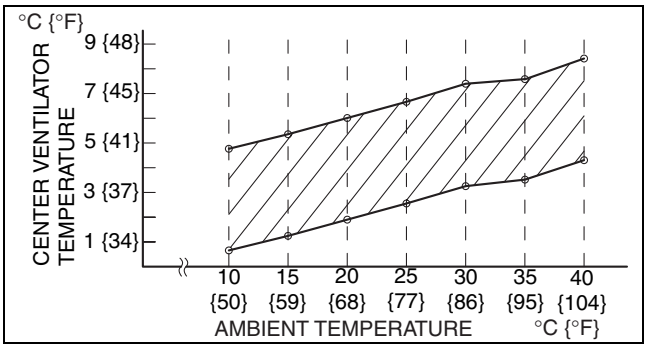
1. Inspect the refrigerant pressure. (See 07-10-6 REFRIGERANT PRESSURE CHECK.)
2. Place a dry-bulb thermometer in the driver-side center ventilator outlet.
3. Start the engine and after it is warmed up, run it at a constant **1,500 rpm.**
4. Set the fan speed to MAX HI.
5. Turn the A/C switch on.
6. Set to RECIRCULATE mode.
7. Set the temperature control to MAX COLD.
8. Set to VENT mode.
9. Close all the doors and windows.
10. Wait until the air conditioner output temperature stabilizes.
    **Stabilized condition**
    - The A/C compressor repeatedly turns on and off at regular intervals.
11. After the blower air is stabilized, read the dry-bulb thermometer.

12. Verify the ambient temperature.
13. Verify that the temperature reading is in the shaded zone.
    - If the there is any malfunction, inspect the refrigerant system according to the troubleshooting chart.



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# 07-11 BASIC SYSTEM

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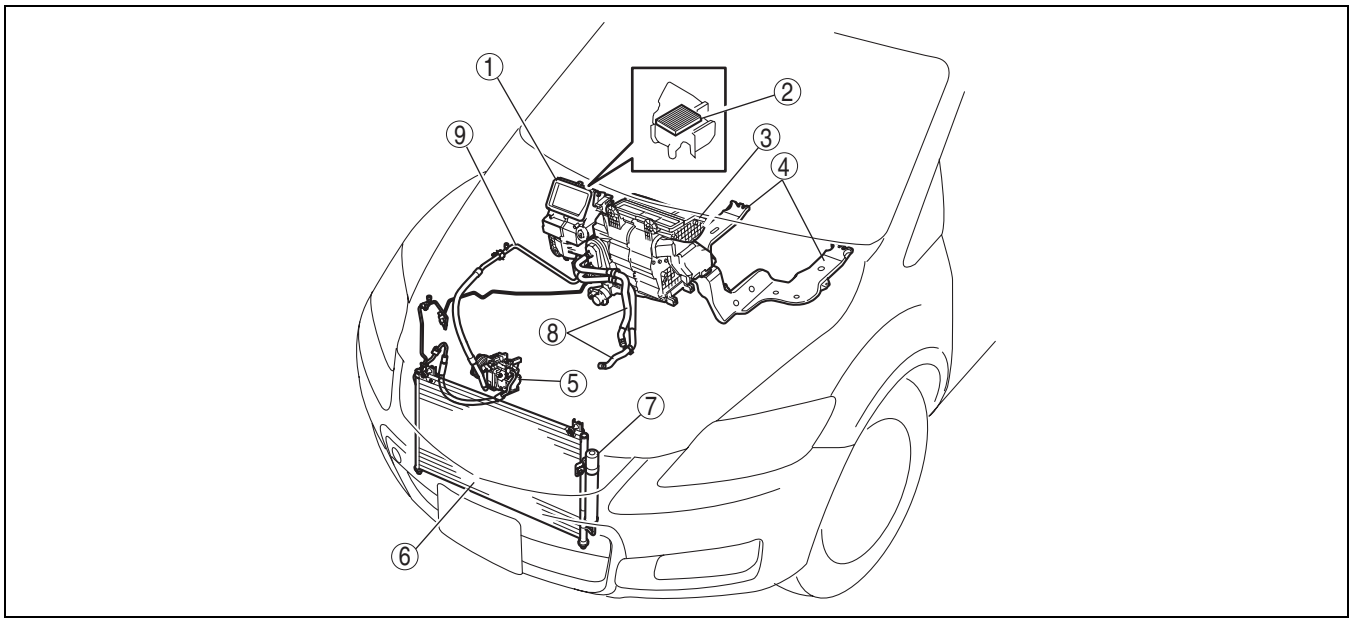


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| | |
|---|---|
| 1 | Blower unit<br>(See 07-11-9 BLOWER UNIT REMOVAL/INSTALLATION.)<br>(See 07-11-11 BLOWER UNIT DISASSEMBLY/ASSEMBLY.) |
| 2 | Air filter<br>(See 07-11-12 AIR FILTER REMOVAL/INSTALLATION.)<br>(See 07-11-12 AIR FILTER INSPECTION.) |
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| 6 | Condenser<br>(See 07-11-17 CONDENSER REMOVAL/INSTALLATION.)<br>(See 07-11-18 CONDENSER INSPECTION.) |
| 7 | Receiver/drier<br>(See 07-11-19 RECEIVER/DRIER REMOVAL/INSTALLATION.) |
| 8 | Heater hose |
| 9 | Refrigerant lines<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/INSTALLATION.) |

## A/C UNIT REMOVAL/INSTALLATION

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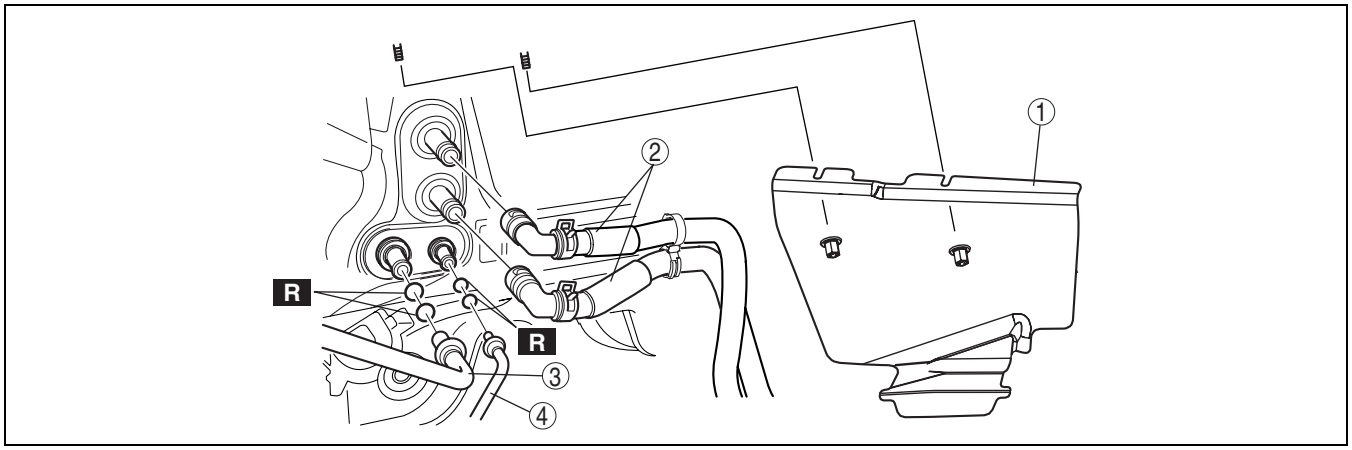
1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
3. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
4. Remove the following parts:
   (1) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Dashboard under cover
   (6) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)

(11)Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
(12)Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
(13)Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
(14)Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
(15)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
(16)Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
(17)Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
(18)Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
(19)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
(20)A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
(21)A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
(22)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)

5. Remove in the order indicated in the table. Do not allow compressor oil to spill.

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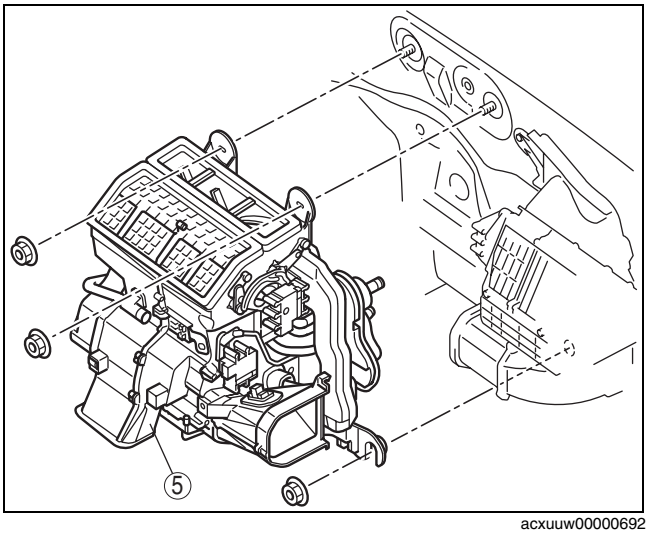
| | |
|---|---|
| 1 | Insulator |
| 2 | Heater hose |
| 3 | Cooler hose (LO)<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/INSTALLATION.) |
| 4 | Cooler pipe<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/INSTALLATION.) |
| 5 | A/C unit<br>(See 07-11-4 A/C Unit Installation Note.) |

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6. Install in the reverse order of removal.
7. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

**A/C Unit Installation Note**

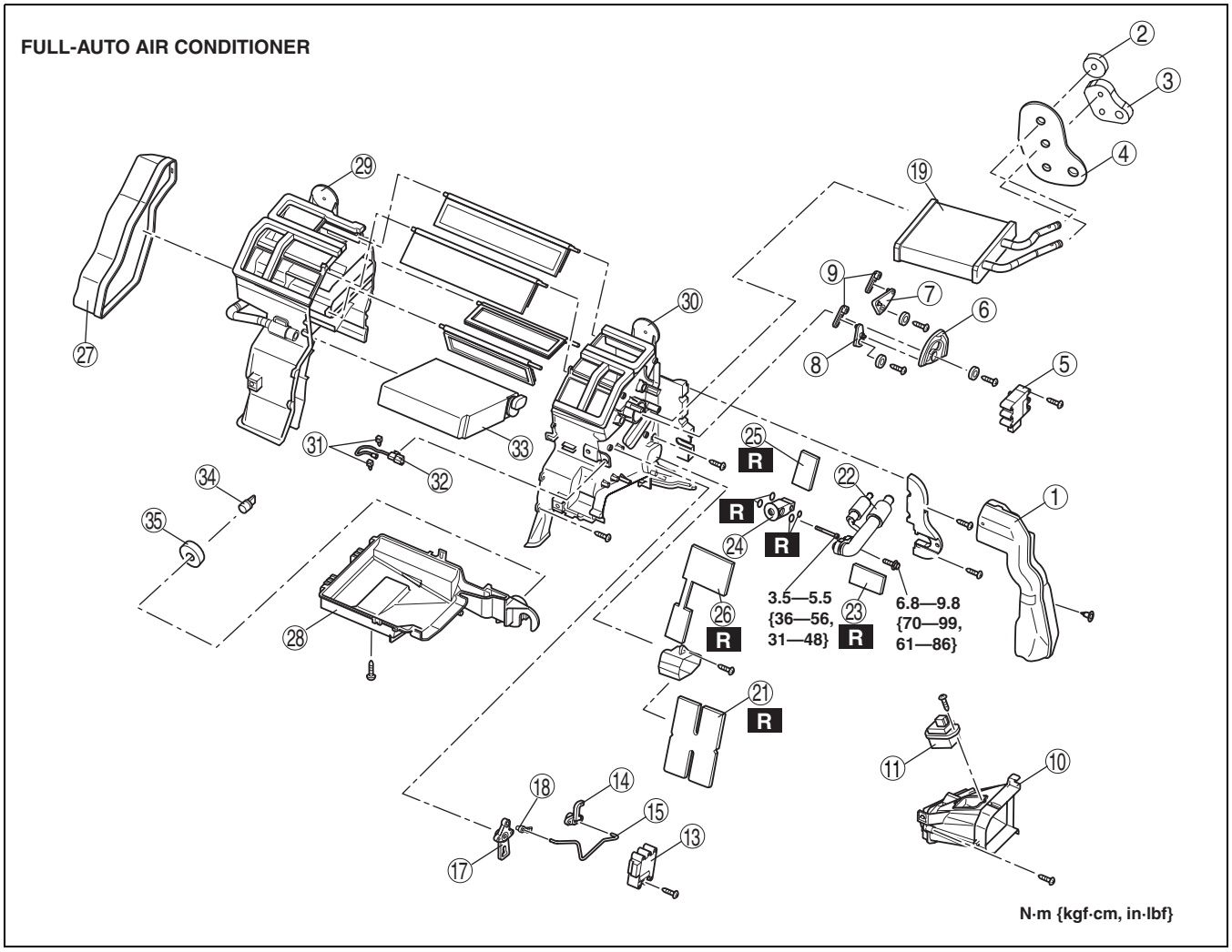
1. When installing a new A/C unit or evaporator, add a supplemental amount of ATMOS GU10 compressor oil into the refrigerant cycle.

**Supplemental amount (approx. quantity)**
**25 ml {25 cc, 0.8 fl oz}**

## A/C UNIT DISASSEMBLY/ASSEMBLY

id071100800300

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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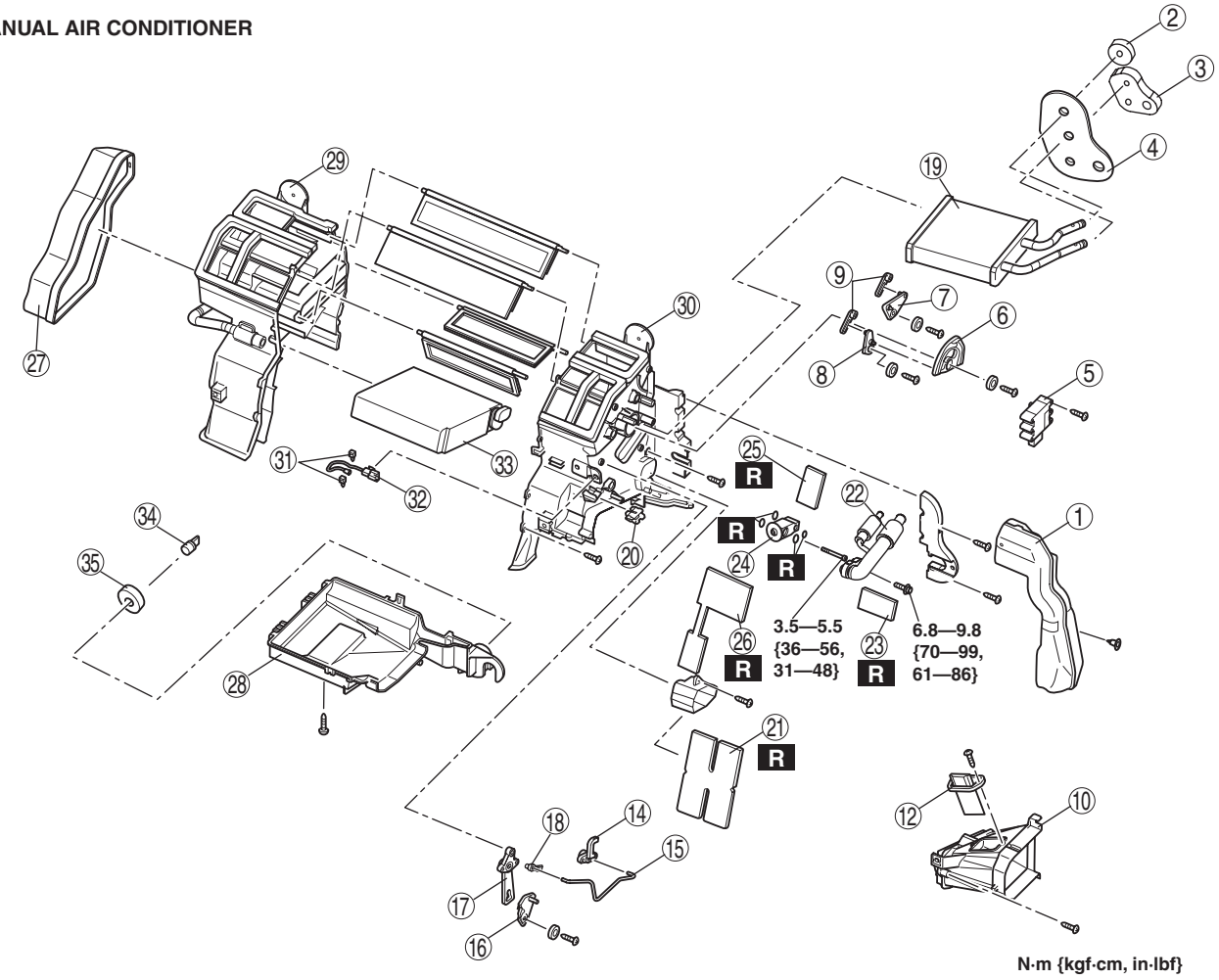
**MANUAL AIR CONDITIONER**

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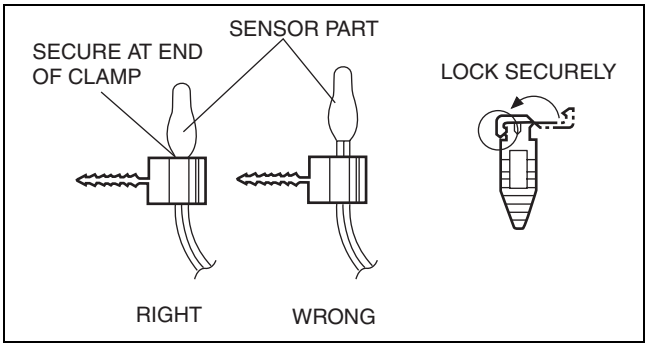
| | |
|---|---|
| 1 | Duct (1) |
| 2 | Polyurethane protector (1) |
| 3 | Polyurethane protector (2) |
| 4 | Polyurethane protector (3) |
| 5 | Airflow mode actuator |
| 6 | Airflow mode main link |
| 7 | Airflow mode sub link (1) |
| 8 | Airflow mode sub link (2) |
| 9 | Airflow mode crank |
| 10 | Duct (2) |
| 11 | Power MOS FET (full-auto air conditioner) |
| 12 | Resistor (manual air conditioner) |
| 13 | Air mix actuator (full-auto air conditioner) |
| 14 | Air mix crank (1) |
| 15 | Air mix rod |
| 16 | Air mix link (manual air conditioner) |
| 17 | Air mix crank (2) |
| 18 | Air mix rod holder |
| 19 | Heater core |
| 20 | Wire clamp (manual air conditioner) |
| 21 | Adhesive polyurethane (1)<br>(See 07-11-7 Adhesive polyurethane (1) Assembly Note.) |

| | |
|---|---|
| 22 | Evaporator pipe |
| 23 | Adhesive polyurethane (3)<br>(See 07-11-7 Adhesive polyurethane (3) Assembly Note.) |
| 24 | Expansion valve |
| 25 | Adhesive polyurethane (4)<br>(See 07-11-7 Adhesive polyurethane (4) Assembly Note.) |
| 26 | Adhesive polyurethane (2)<br>(See 07-11-6 Adhesive polyurethane (2) Assembly Note.) |
| 27 | Duct (3) |
| 28 | A/C case (3) |
| 29 | A/C case (1) |
| 30 | A/C case (2) |
| 31 | Sensor clamp<br>(See 07-11-6 Sensor Clamp Assembly Note.) |
| 32 | Evaporator temperature sensor<br>(See 07-11-6 Evaporator Temperature Sensor Assembly Note.) |
| 33 | Evaporator |
| 34 | Drain hose |
| 35 | Polyurethane protector (4) |

**Sensor Clamp Assembly Note**

1. Attach the sensor clamp as shown in the figure.

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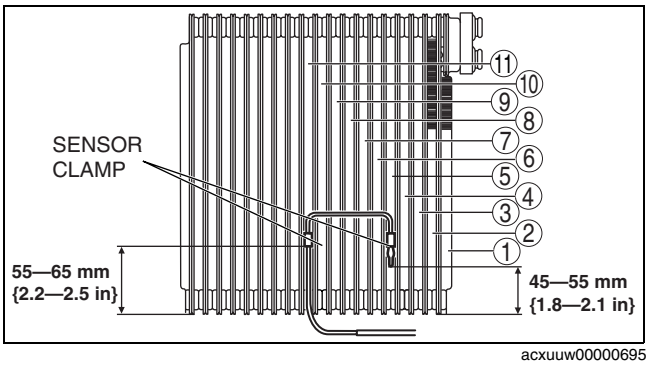
**Evaporator Temperature Sensor Assembly Note**

1. Assemble the evaporator temperature sensor as shown in the figure.

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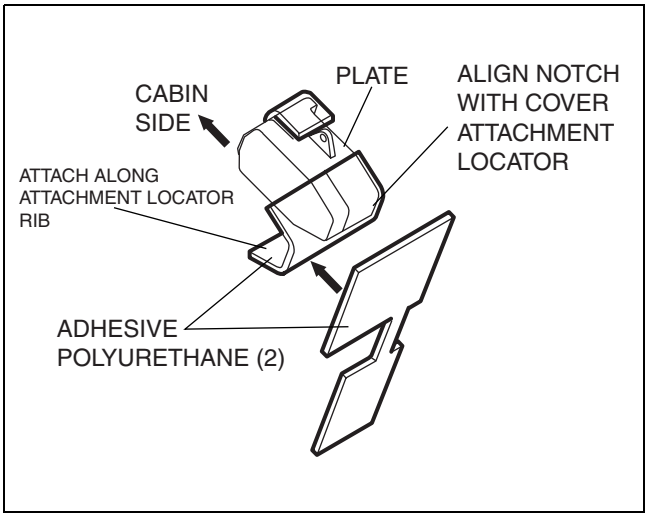
**Adhesive polyurethane (2) Assembly Note**

1. Attach the adhesive polyurethane (2) as shown in the figure.

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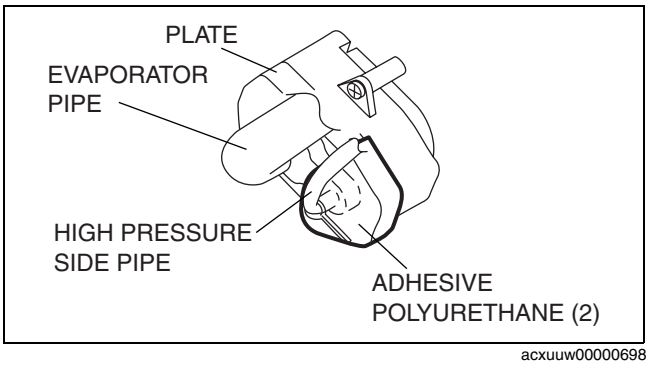
2. After assembling the evaporator pipe as shown in the figure, attach the adhesive polyurethane (2) so that it adheres around the high-pressure side of the evaporator pipe.

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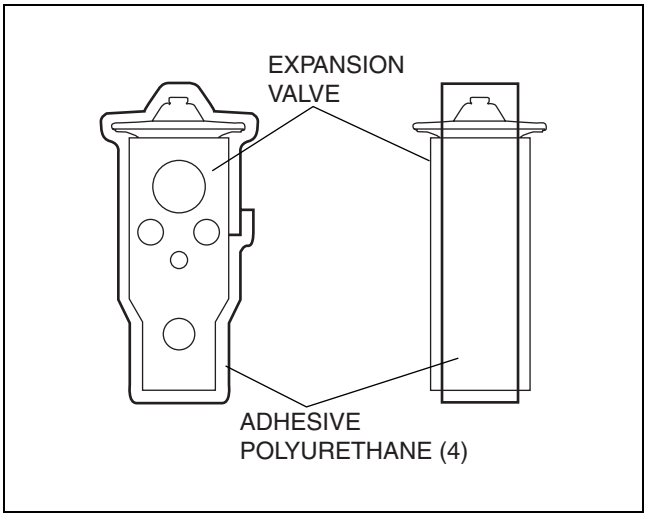
**Adhesive polyurethane (4) Assembly Note**

1. Attach the adhesive polyurethane (4) so that it adheres around the expansion valve.

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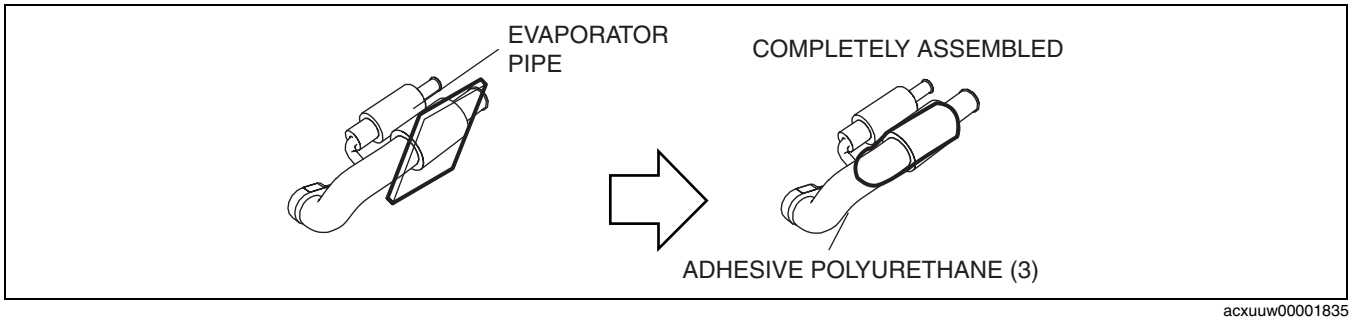
**Adhesive polyurethane (3) Assembly Note**

1. Attach the adhesive polyurethane (3) so that it adheres around the low-pressure side of the evaporator pipe.



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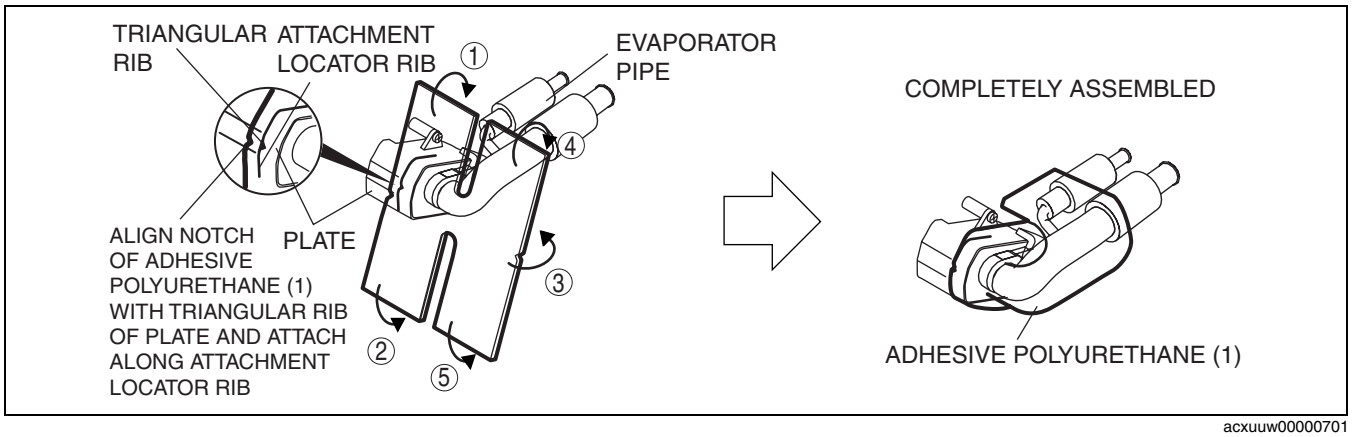
**Adhesive polyurethane (1) Assembly Note**

1. Attach the adhesive polyurethane (1) as shown in the figure.

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## EXPANSION VALVE REMOVAL/INSTALLATION

id071100800400

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)

**Caution**
- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

3. Remove the insulator. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.)
4. Disconnect the cooler hose (LO) and cooler pipe. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.)
5. Remove the following parts:
   (1) Dashboard under cover
   (2) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (3) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (4) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (5) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (6) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (7) Hood release (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10)Passenger-side air bag module (See 08-10-8 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
6. Remove the airflow mode actuator. (See 07-40-10 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION.)
7. Disconnect the air intake actuator connector.
8. Remove the duct (1).
9. Remove the adhesive polyurethane (1). (See 07-11-4 A/C UNIT DISASSEMBLY/ASSEMBLY.)

**Caution**
- **Being careful not to damage the adhesive sponge rubber or adhesive polyurethane, remove adhesive polyurethane completely.**

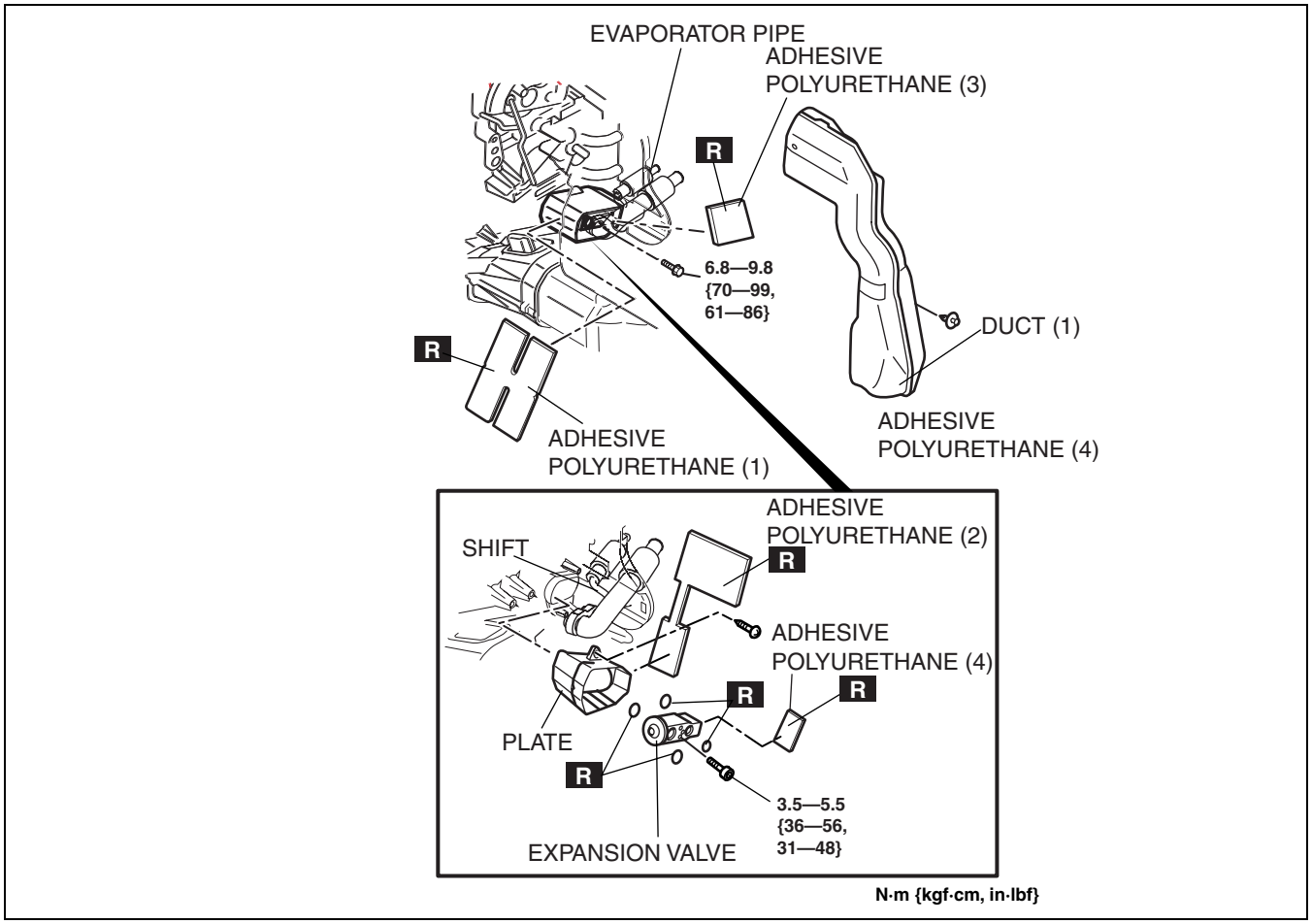
10. Remove the one bolt and shift the evaporator pipe. Do not allow compressor oil to spill.
11. Remove the two bolts.
12. Remove the expansion valve. Do not allow compressor oil to spill.
13. Remove the screws and plate.
14. Remove the adhesive polyurethane (2). (See 07-11-4 A/C UNIT DISASSEMBLY/ASSEMBLY.)

**Caution**
- **Being careful not to damage the adhesive sponge rubber or adhesive polyurethane, remove adhesive polyurethane completely.**

15. Remove the adhesive polyurethane (3). (See 07-11-4 A/C UNIT DISASSEMBLY/ASSEMBLY.)

**Caution**
- **Being careful not to damage the adhesive sponge rubber or adhesive polyurethane, remove adhesive polyurethane completely.**

16. Remove the adhesive polyurethane (4). (See 07-11-4 A/C UNIT DISASSEMBLY/ASSEMBLY.)

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17. Install in the reverse order of removal.
18. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

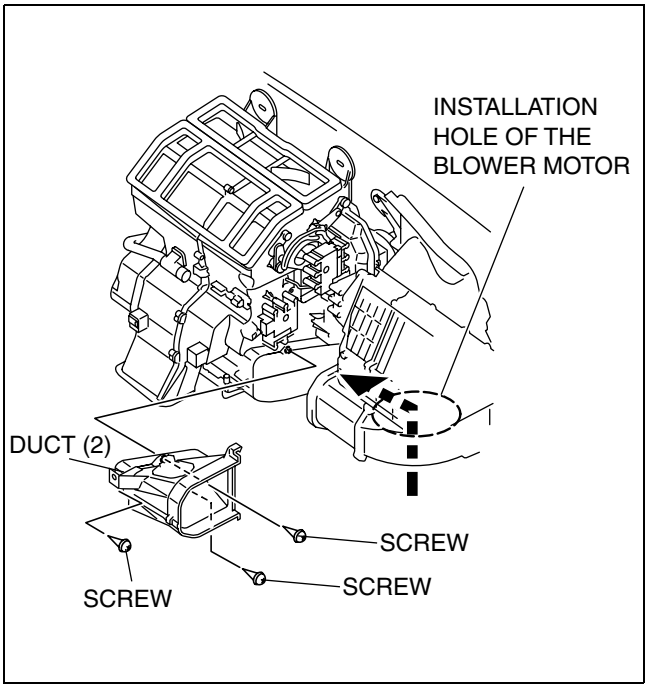
**BLOWER UNIT REMOVAL/INSTALLATION**

id071100800500

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Dashboard under cover
   (6) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (11) Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
   (12) Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
   (13) Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (14) Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
   (15) Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (16) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (17) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (18) Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (19) Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)

(20)A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
(21)A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
(22)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)

3. Remove the blower motor. (See 07-40-8 BLOWER MOTOR REMOVAL/INSTALLATION.)
4. Remove the power MOS FET (Full-auto air conditioner) or resistor. (Manual air conditioner) (See 07-40-4 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION.) (See 07-40-7 RESISTOR REMOVAL/INSTALLATION.)
5. Remove the blower unit installation nuts.
6. Remove the screw securing the duct (2) to the A/C unit, by inserting a phillips screwdriver into the hole made after removing the blower motor.
7. Remove the screw securing the duct (2) to the A/C unit.
8. Remove the duct (2).

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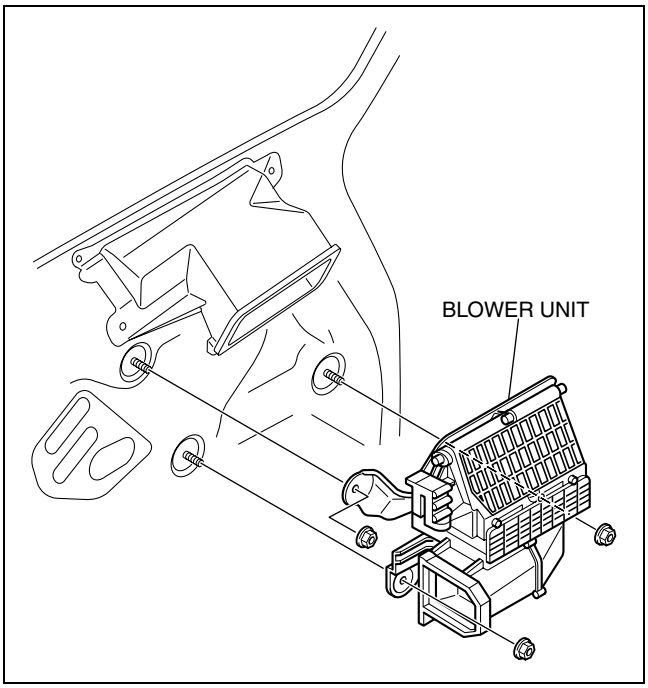
9. Remove the blower unit.
10. Temporary install the blower unit.
11. Install in the duct (2).
12. Install the two outer screws, securing the duct (2) to the A/C unit.

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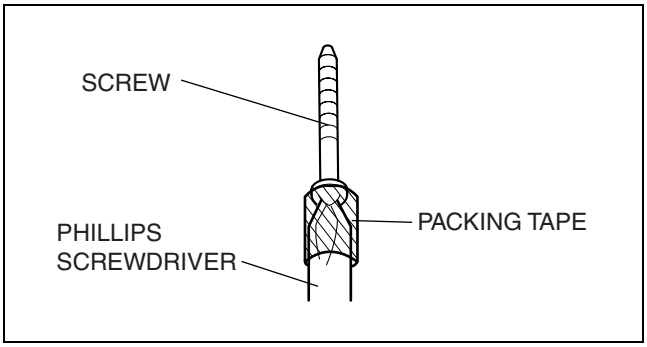
13. Install the screw on the end of the phillips screwdriver with the packing tape.

**Caution**
- **If the packing tape remains in the duct (2), it may become a source of noise. Wind up the packing tape to prevent pinching when tightening the screw.**

14. Install the duct (2) to the A/C unit by inserting a phillips screwdriver, with the screw, into the hole made after removing the blower motor.
15. Pull out the phillips screwdriver together with the packing tape.
16. Install in the reverse order of removal.

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### BLOWER UNIT DISASSEMBLY/ASSEMBLY

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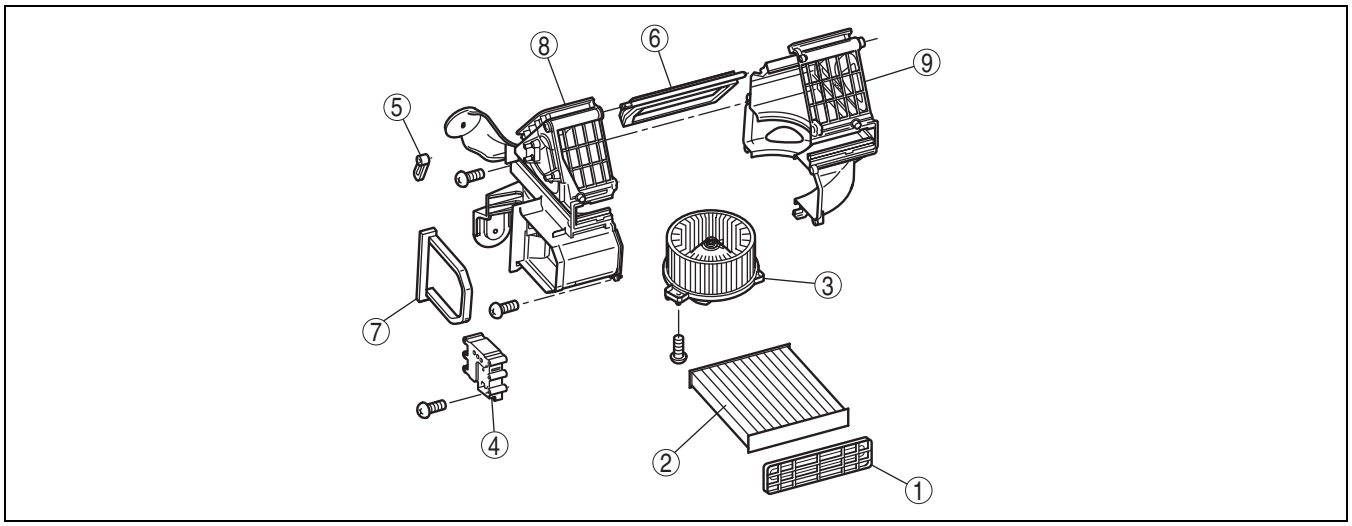
1. Disassemble in the order indicated in the table.

**Caution**
- **Apply only the specified grease to the link. Otherwise abnormal noise or improper operation may result.**



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| | |
|---|---|
| 1 | Air filter cover |
| 2 | Air filter |
| 3 | Blower motor |
| 4 | Air intake actuator |
| 5 | Air intake crank |

| | |
|---|---|
| 6 | Air intake door |
| 7 | Polyurethane protector |
| 8 | Blower case (1) |
| 9 | Blower case (2) |

2. Assemble in the reverse order of disassembly.

## AIR FILTER REMOVAL/INSTALLATION

id071100800700

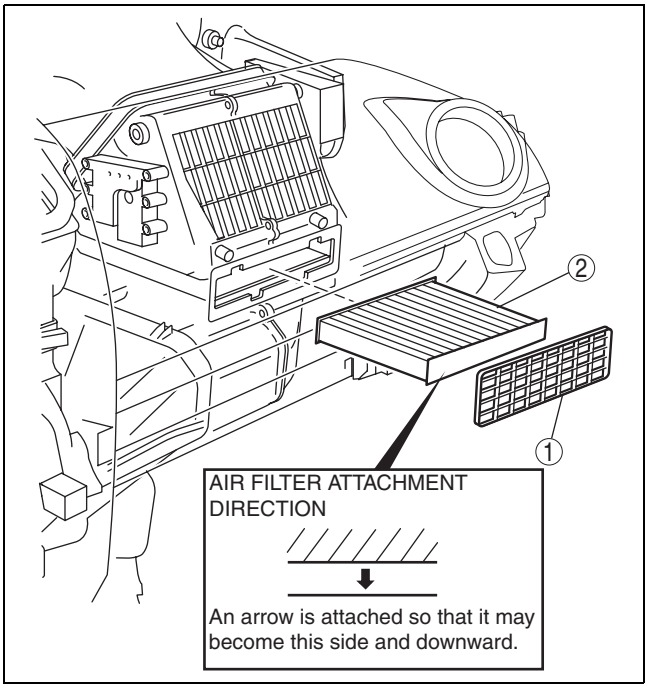
**Caution**

- **If the air conditioner is used or the vehicle is driven with the air filter removed, snow or foreign material can penetrate the blower motor, causing motor lock or damage. As a result, low visibility due to window fogging or air conditioner malfunction could occur. Do not use the air conditioner or drive the vehicle with the air filter removed.**

1. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Air filter cover |
| 2 | Air filter |

3. Install in the reverse order of removal.

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## AIR FILTER INSPECTION

id071100800800

1. Inspect for damage, excessive dirt, or foul smell.
   - If the air filter is damaged, excessively dirty, or foul smelling, replace it.

**Note**

- The air filter cannot be reused by cleaning it with water or compressed air.

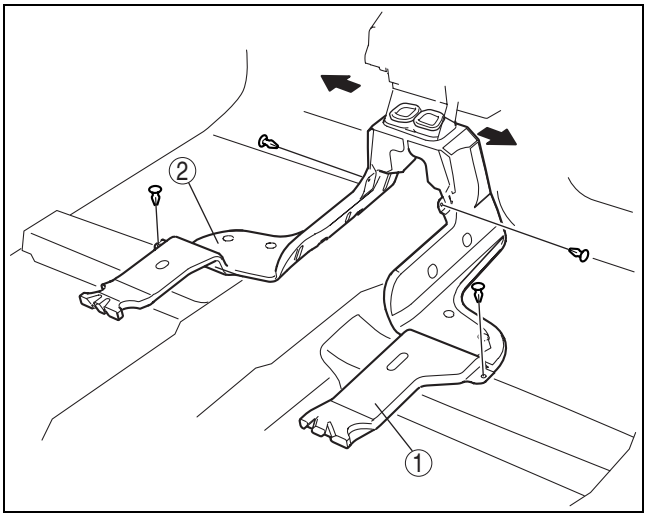
## REAR HEAT DUCT REMOVAL/INSTALLATION

id071100800900

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front seat (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
   (2) Car-navigation unit (With car-navigation system) (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Console panel (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (6) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
3. Turn over the floor covering. (See 09-17-28 FLOOR COVERING REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Rear heat duct (RH) |
| 2 | Rear heat duct (LH) |

5. Install in the reverse order of removal.

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## A/C COMPRESSOR REMOVAL/INSTALLATION

id071100801000

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
3. Remove the splash shield.
4. Loosen the drive belt and remove it.

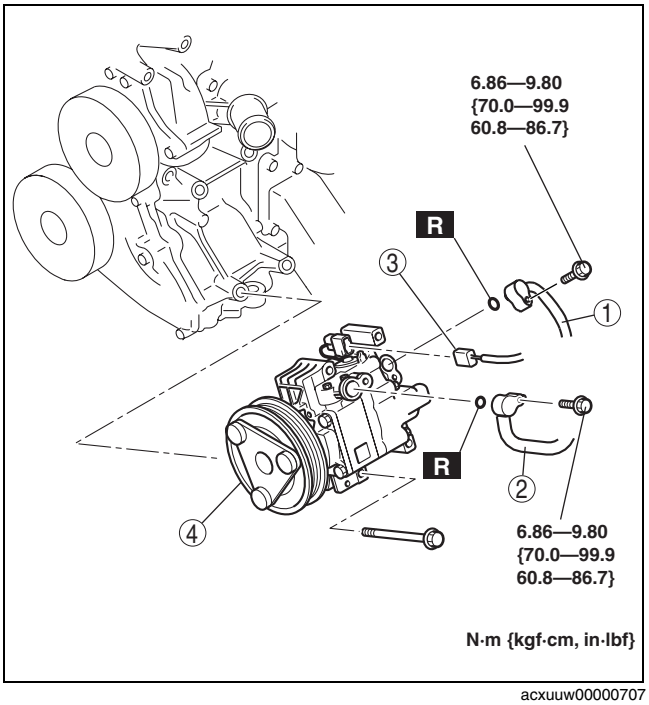
   **Caution**

   - **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

5. Remove in the order indicated in the table. Do not allow compressor oil to spill.

| | |
|---|---|
| 1 | Cooler hose (HI)<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/INSTALLATION.) |
| 2 | Cooler hose (LO)<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/INSTALLATION.) |
| 3 | Magnetic clutch connector |
| 4 | A/C compressor<br>(See 07-11-14 A/C Compressor Installation Note.) |

6. Install in the reverse order of removal.
7. Install the drive belt. (See 01-10-3 DRIVE BELT REMOVAL/INSTALLATION[L3 WITH TC].)
8. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

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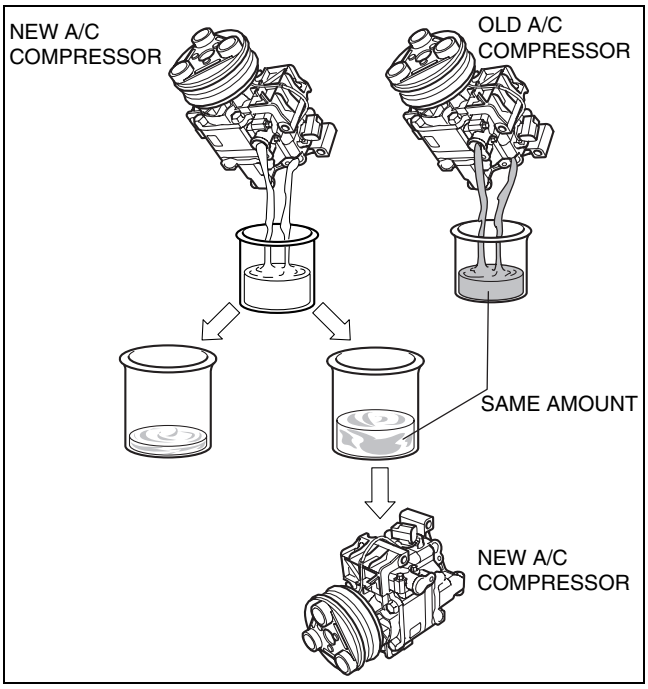
**A/C Compressor Installation Note**

**Caution**
- **Due to the high moisture-absorption characteristics of the compressor oil, it may absorb moisture if left over a long period of time thereby negatively affecting A/C operation. Drain the compressor oil and refill within 10 min. of each other.**

1. Rotate new A/C compressor shaft six to eight revolutions while collecting refrigerant oil in a clean measuring device. Use this refrigerant oil to refill new A/C compressor. Do not allow refrigerant oil to become contaminated.
2. Rotate old A/C compressor shaft six to eight revolutions while collecting refrigerant oil in a separate, clean measuring device.
3. Compare those oil amounts. The amount of the oil drained from the new A/C compressor should be greater than the old one.
4. Pour the same amount oil of drained from the old A/C compressor back into the new A/C compressor.

**A/C compressor oil type**
- **ATMOS GU10**

**A/C compressor oil sealed volume (approx. quantity)**
- **120 ml {120 cc, 4.06 fl oz}**

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## REFRIGERANT LINES REMOVAL/INSTALLATION

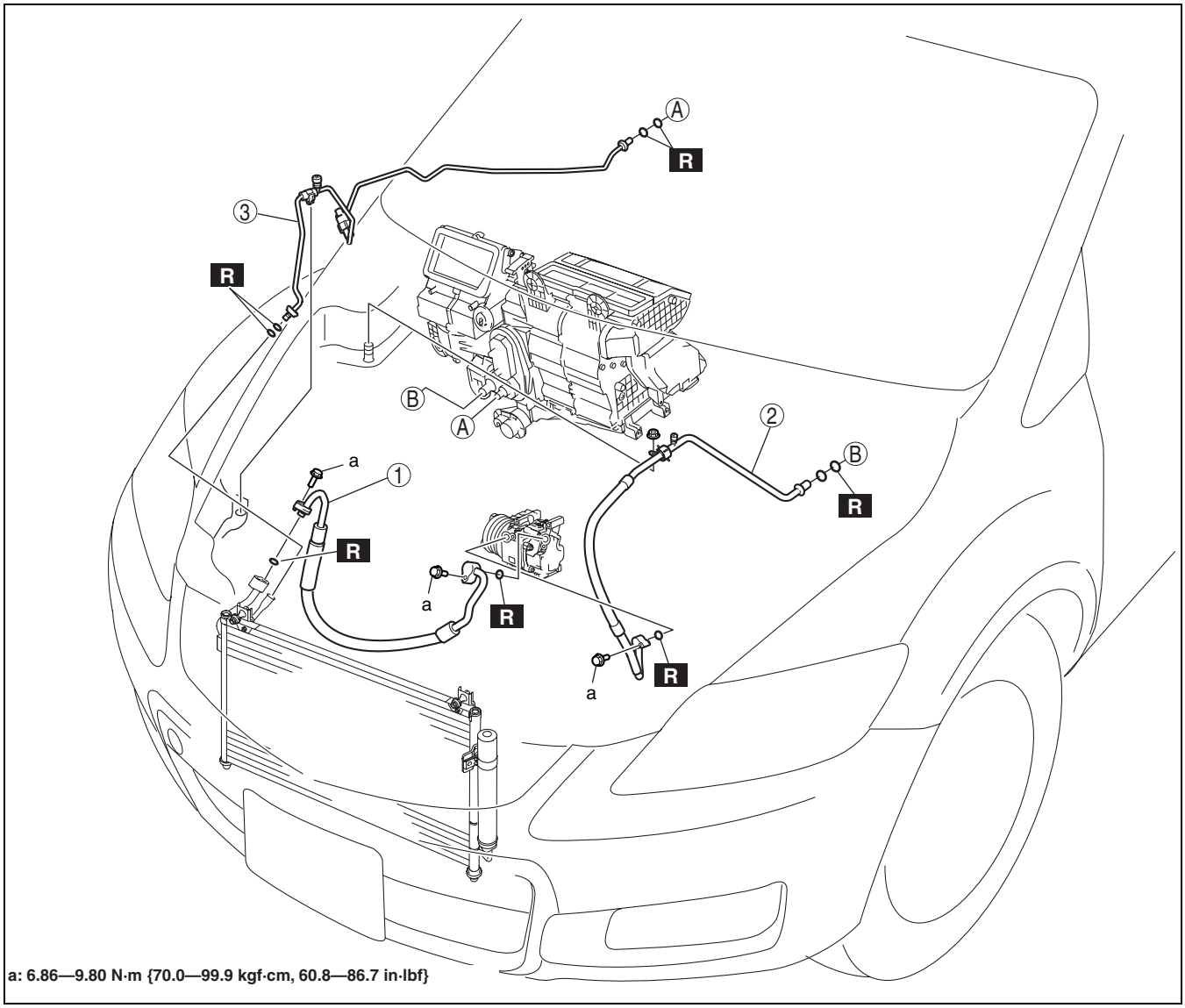
id071100801100

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
3. Disconnect the body earth cable installed to No.3 engine mount rubber.
4. Disconnect the insulator. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.)
5. Remove in the order indicated in the table. Do not allow compressor oil to spill.

**Caution**

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

6. Install in the reverse order of removal.
7. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

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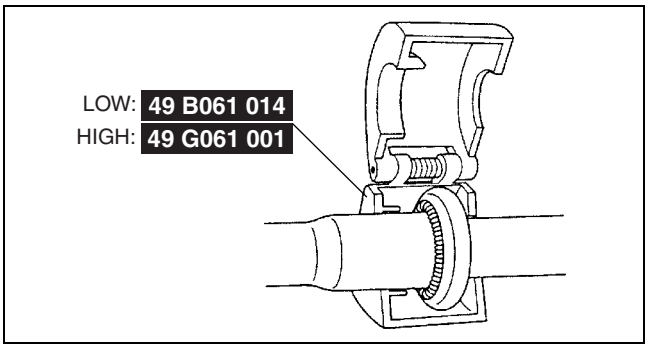
| | |
|---|---|
| 1 | Cooler hose (HI)<br>(See07-11-16 Refrigerant Line Removal Note.)<br>(See07-11-16 Refrigerant Line Installation Note.) |
| 2 | Cooler hose (LO)<br>(See07-11-16 Refrigerant Line Removal Note.)<br>(See07-11-16 Refrigerant Line Installation Note.) |

| | |
|---|---|
| 3 | Cooler pipe<br>(See07-11-16 Refrigerant Line Removal Note.)<br>(See07-11-16 Refrigerant Line Installation Note.) |

**Refrigerant Line Removal Note**
**Spring-lock coupling type**

1. Set the **SST.**

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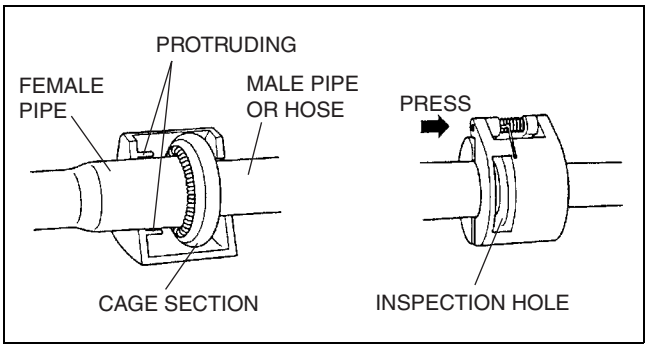
2. While looking through the inspection hole of the **SST**, insert the protruding part of the **SST** until it makes contact with the cage section.
3. Use the **SST** to disconnect the male pipe or hose from the female by pulling the male pipe or hose.

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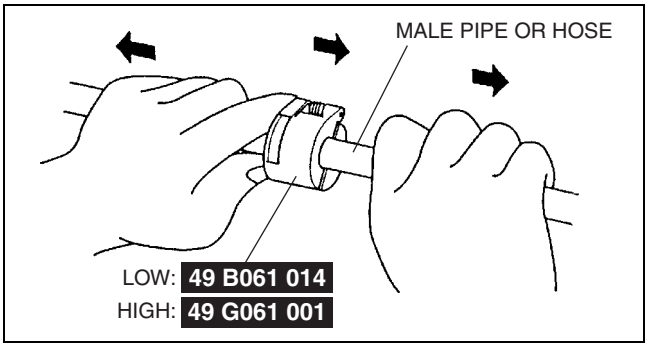
**Note**

- The male pipe or hose can be disconnected easily from the female pipe by pulling from the male pipe or hose while maintaining the pressure of the protruding part of the SST.

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**Refrigerant Line Installation Note**

1. When installing a new cooler pipe or cooler hose, add a supplemental amount of ATMOS GU10 compressor oil into the refrigeration cycle.

   **Supplemental amount (approx. quantity)**
   **5 ml {5 cc, 0.2 fl oz}: Cooler pipe**
   **10 ml {10 cc, 0.3 fl oz}: Cooler hose**

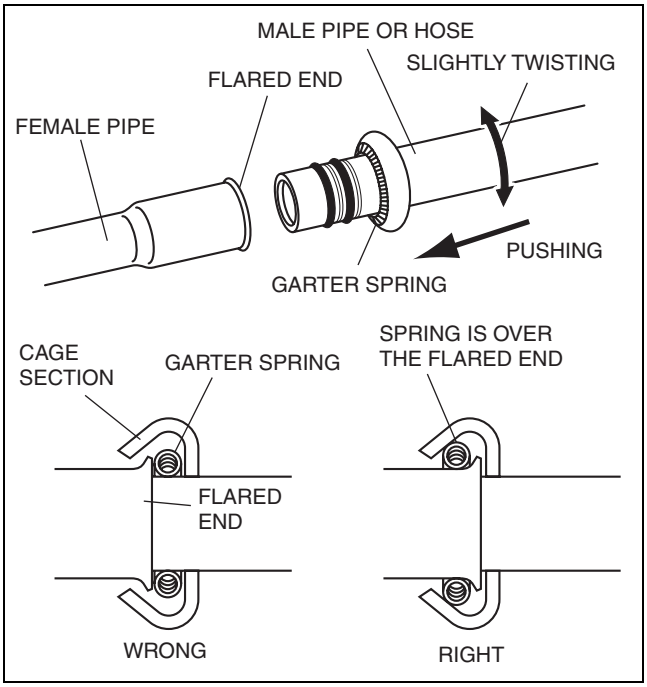
2. Apply compressor oil to the O-rings and connect the joints.
3. Tighten the joints.

**Spring-lock coupling type**

1. Connect the male pipe or hose by pushing it while slightly twisting it onto female pipe until the garter spring at the male pipe or hose is over the flared end of female pipe.

**Note**

- When the male pipe or hose is replaced, the indicator ring comes out after connecting to indicate that it is locked.

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**CONDENSER REMOVAL/INSTALLATION**

id071100801200

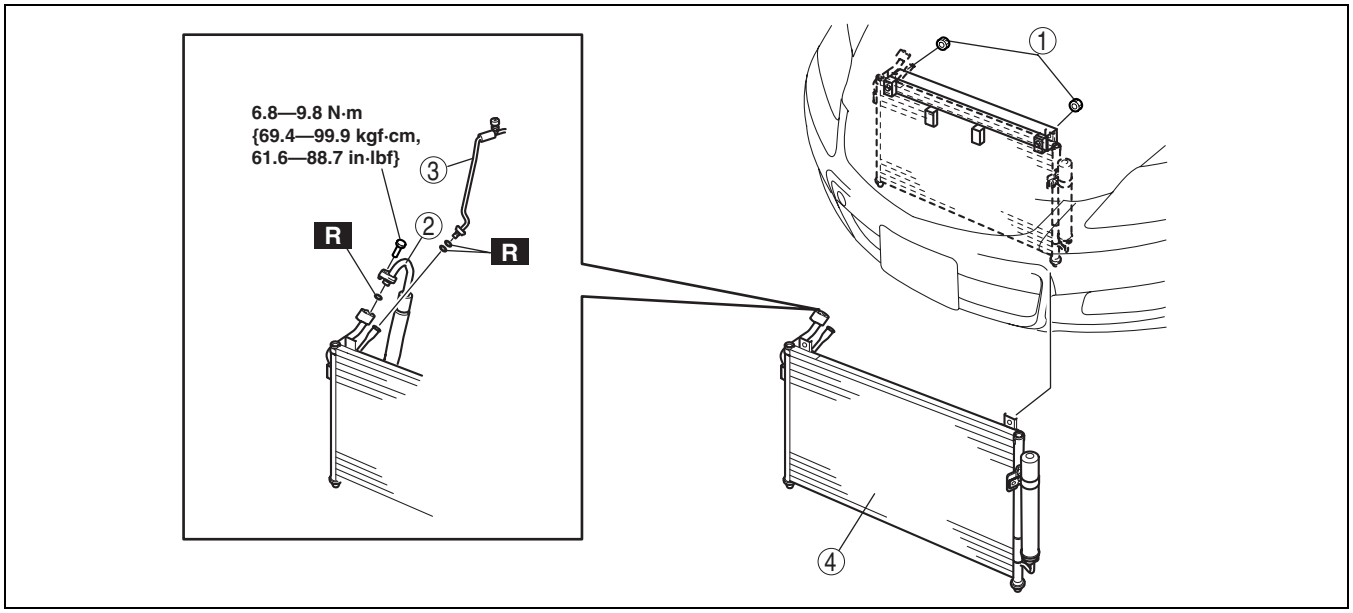
1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
3. Remove the air cleaner. (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
4. Remove the splash shield.
5. Drain the engine coolant. (See 01-12-5 ENGINE COOLANT REPLACEMENT[L3 WITH TC].)
6. Remove the following parts:
   (1) Charge air cooler duct, air cleaner and fresh air duct component (See 01-13-5 INTAKE AIR SYSTEM REMOVAL/INSTALLATION[L3 WITH TC].)
   (2) Coolant reserve tank (See 01-12-7 COOLANT RESERVE TANK REMOVAL/INSTALLATION[L3 WITH TC].)
   (3) Dipstick pipe (See 01-11-6 OIL PAN REMOVAL/INSTALLATION[L3 WITH TC].)
   (4) Cooling fan component (See 01-12-12 FAN MOTOR REMOVAL/INSTALLATION[L3 WITH TC].)
7. Remove the radiator. (See 01-12-8 RADIATOR REMOVAL/INSTALLATION[L3 WITH TC].)

**Caution**

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

8. Remove in the order indicated in the table. Do not allow compressor oil to spill.

9. Install in the reverse order of removal.

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| | |
|---|---|
| 1 | Nut |
| 2 | Cooler hose (HI)<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/ INSTALLATION.) |
| 3 | Cooler pipe<br>(See 07-11-15 REFRIGERANT LINES REMOVAL/ INSTALLATION.) |
| 4 | Condenser<br>(See 07-11-17 CONDENSER REMOVAL/ INSTALLATION.) |

10. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

**Condenser Installation Note**

1. After replacing the condenser, add compressor oil to the refrigeration cycle.

   **Supplemental oil amount (approx. quantity)**
   **20 ml {20 cc, 0.7 fl oz}**

**CONDENSER INSPECTION**

id071100801300

1. Inspect for cracks, damage, and oil leakage.
   - If any are found, replace the condenser.
2. Inspect for fins clogged by dust.
   - If any are clogged, remove the dust from the fins.
3. Inspect for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.

## RECEIVER/DRIER REMOVAL/INSTALLATION

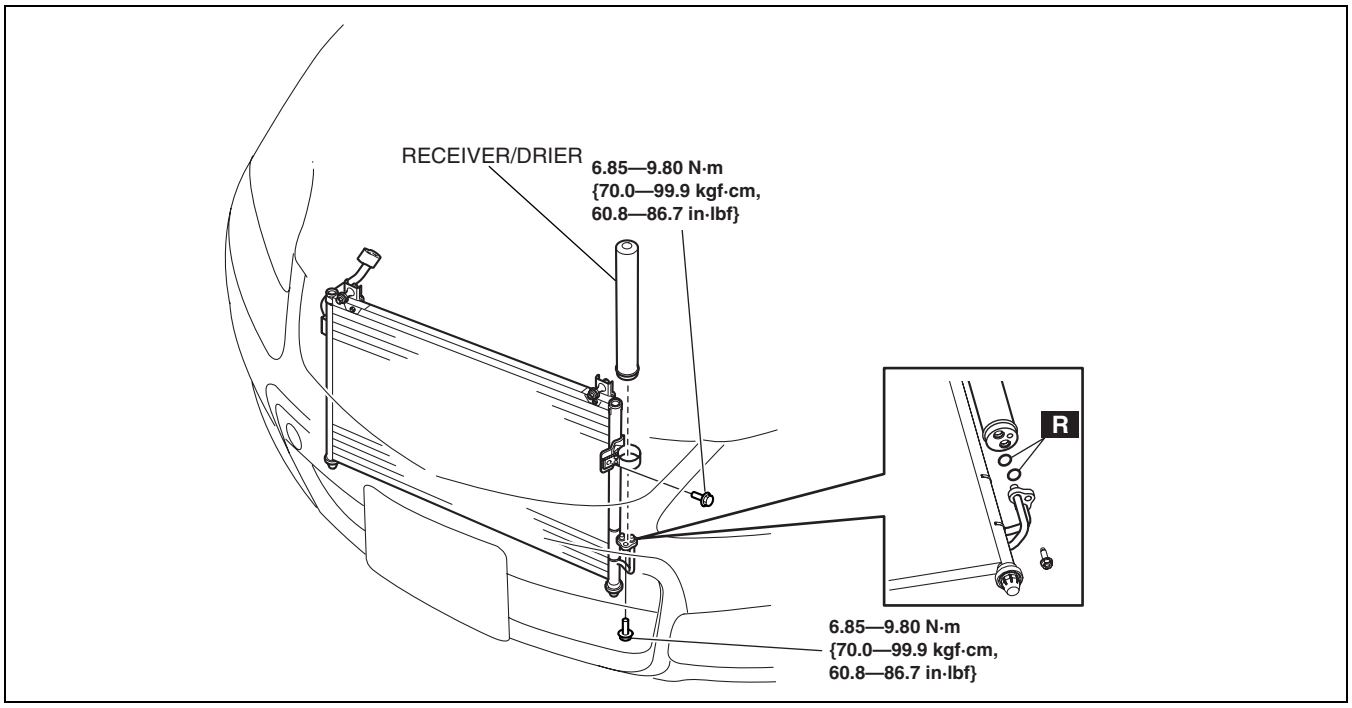
id071100801400

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
3. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove the oil cooler. (See 01-11-6 OIL COOLER REMOVAL/INSTALLATION[L3 WITH TC].)

**Caution**

- **If moisture or foreign material enters the refrigeration cycle, cooling ability will be lowered and abnormal noise will occur. Always immediately plug all open fittings after removing any refrigeration cycle parts to keep moisture or foreign material out of the cycle.**

5. Remove the receiver/drier. Do not allow compressor oil to spill. (See 07-11-19 Receiver/Drier Removal Note.)

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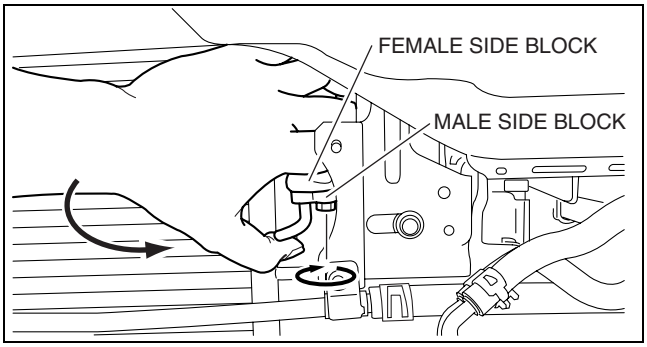
6. Install in the reverse order of removal. (See 07-11-20 Receiver/Drier Installation Note.)
7. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

**Receiver/Drier Removal Note**

1. Disconnect the block joint type pipes by grasping female side of the block with hand and holding firmly, then tighten the connection bolt.

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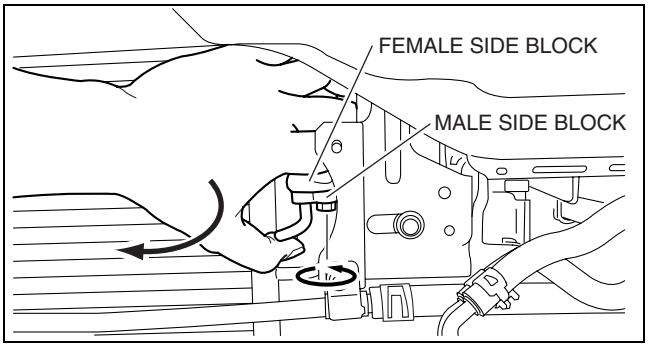
**Receiver/Drier Installation Note**

1. Tighten the bolt of joint by hand.
2. Tighten the joint to the specified torque.
3. Connect the block joint type pipe by grasping the female side of the block with hand holding firmly, then tighten the connection bolt.

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**EVAPORATOR INSPECTION**

id071100801500

1. Remove the A/C unit. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.)
2. Remove the evaporator from the A/C unit.
3. Inspect for cracks, damage, and oil leakage.
   - If any problems are found, replace the evaporator.
4. Inspect for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.

**HEATER CORE INSPECTION**

id071100801600

1. Remove the A/C unit. (See 07-11-2 A/C UNIT REMOVAL/INSTALLATION.)
2. Remove the heater core from the A/C unit.
3. Inspect for cracks, damage, and coolant leakage.
   - If any problems are found, replace the heater core.
4. Inspect for bent fins.
   - If any are bent, use a flathead screwdriver to straighten them.
5. Verify that the heater core inlet and outlet pipe are not distorted or damaged.
   - Repair with pliers if necessary.

# 07-40 CONTROL SYSTEM


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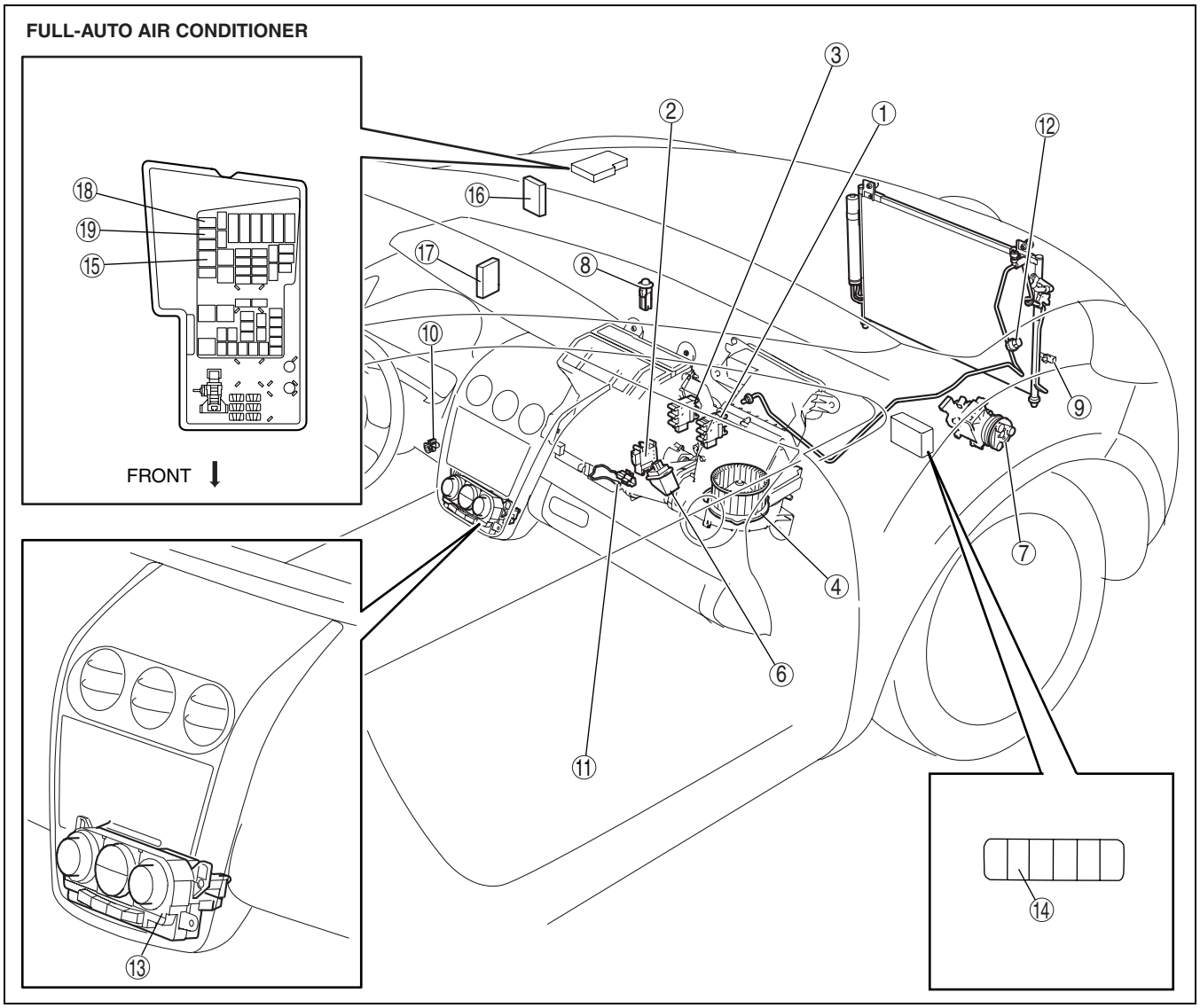


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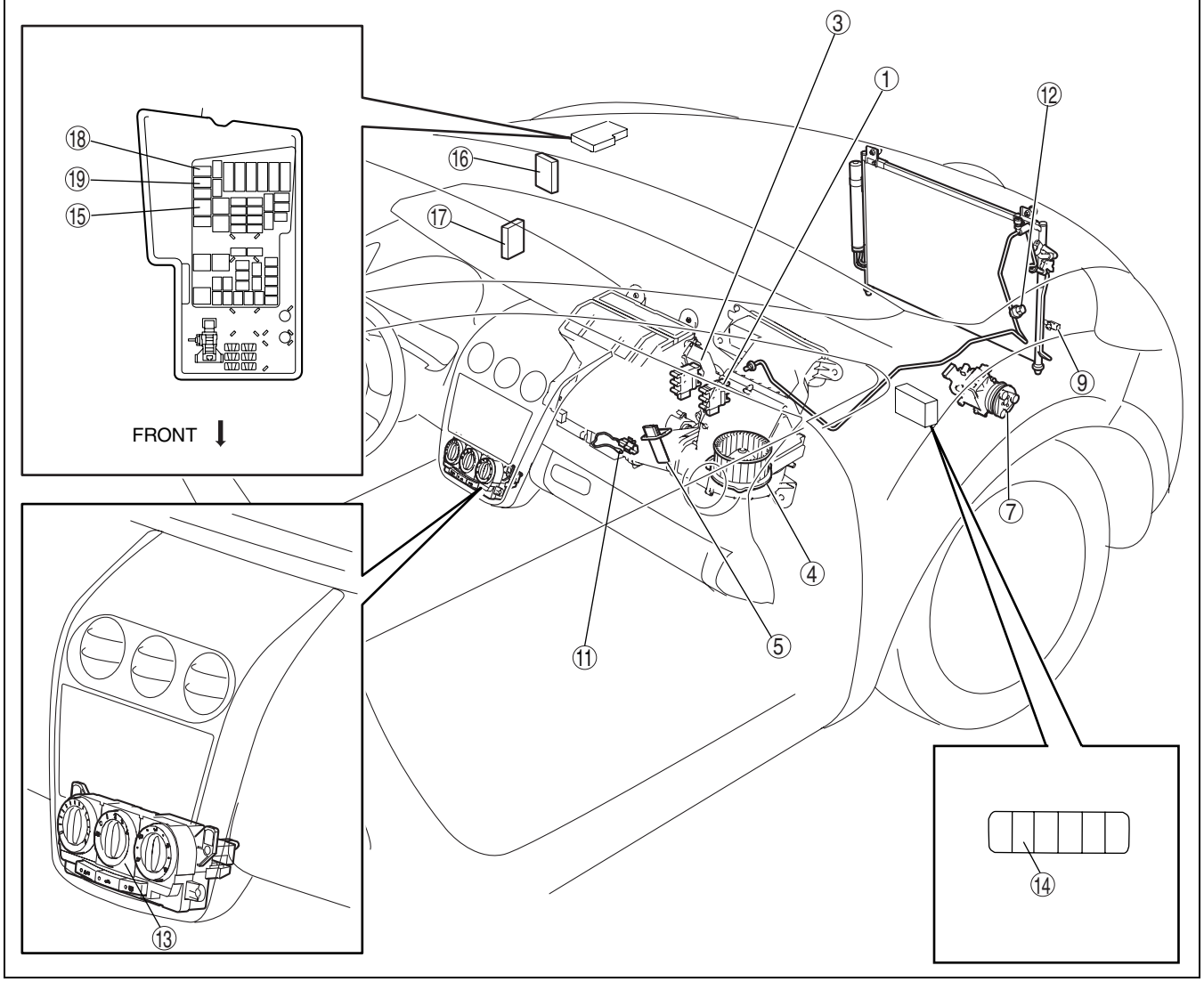
**MANUAL AIR CONDITIONER**

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| | |
|---|---|
| 1 | Air intake actuator<br>(See 07-40-9 AIR INTAKE ACTUATOR REMOVAL/INSTALLATION.)<br>(See 07-40-10 AIR INTAKE ACTUATOR INSPECTION.) |
| 2 | Air mix actuator (full-auto air conditioner)<br>(See 07-40-19 AIR MIX ACTUATOR REMOVAL/INSTALLATION.)<br>(See 07-40-21 AIR MIX ACTUATOR INSPECTION.) |
| 3 | Airflow mode actuator<br>(See 07-40-10 AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION.)<br>(See 07-40-11 AIRFLOW MODE ACTUATOR INSPECTION.) |
| 4 | Blower motor<br>(See 07-40-8 BLOWER MOTOR REMOVAL/INSTALLATION.)<br>(See 07-40-8 BLOWER MOTOR INSPECTION.) |
| 5 | Resistor (manual air conditioner)<br>(See 07-40-7 RESISTOR REMOVAL/INSTALLATION.)<br>(See 07-40-7 RESISTOR INSPECTION.) |

| | |
|---|---|
| 6 | Power MOS FET (full-auto air conditioner)<br>(See 07-40-4 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION.)<br>(See 07-40-5 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) INSPECTION.) |
| 7 | Magnetic clutch<br>(See 07-40-5 MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY.)<br>(See 07-40-6 MAGNETIC CLUTCH ADJUSTMENT.)<br>(See 07-40-7 MAGNETIC CLUTCH INSPECTION.) |
| 8 | Solar radiation sensor (full-auto air conditioner)<br>(See 07-40-22 SOLAR RADIATION SENSOR REMOVAL/INSTALLATION.)<br>(See 07-40-23 SOLAR RADIATION SENSOR INSPECTION.) |
| 9 | Ambient temperature sensor<br>(See 07-40-24 AMBIENT TEMPERATURE SENSOR REMOVAL/INSTALLATION.)<br>(See 07-40-24 AMBIENT TEMPERATURE SENSOR INSPECTION.) |

| | |
|---|---|
| 10 | Passenger compartment temperature sensor (full-auto air conditioner)<br>(See 07-40-23 PASSENGER COMPARTMENT TEMPERATURE SENSOR REMOVAL/INSTALLATION.)<br>(See 07-40-23 PASSENGER COMPARTMENT TEMPERATURE SENSOR INSPECTION.) |
| 11 | Evaporator temperature sensor<br>(See 07-40-8 EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION.)<br>(See 07-40-9 EVAPORATOR TEMPERATURE SENSOR INSPECTION.) |
| 12 | Refrigerant pressure switch<br>(See 07-40-21 REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION.)<br>(See 07-40-22 REFRIGERANT PRESSURE SWITCH INSPECTION.) |
| 13 | Climate control unit<br>(See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)<br>(See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].)<br>(See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)<br>(See 07-40-11 CLIMATE CONTROL UNIT DISASSEMBLY/ASSEMBLY.)<br>(See 07-40-12 CLIMATE CONTROL UNIT WIRE ADJUSTMENT.)<br>(See 07-40-13 CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER].)<br>(See 07-40-16 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)<br>(See 07-40-26 AIRFLOW VOLUME CONTROL DIAL INSPECTION.) |
| 14 | A/C relay<br>(See 09-21-4 RELAY INSPECTION.) |
| 15 | Blower relay<br>(See 09-21-4 RELAY INSPECTION.) |
| 16 | PCM<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 01-40-6 PCM INSPECTION[L3 WITH TC].) |
| 17 | BCM<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.)<br>(See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.) |
| 18 | Rear window defroster relay<br>(See 09-21-4 RELAY INSPECTION.) |
| 19 | TNS relay<br>(See 09-21-4 RELAY INSPECTION.) |

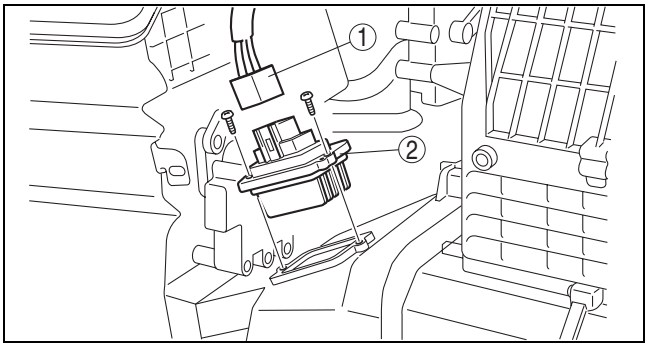
**POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION**

id074000800200

1. Disconnect the negative battery cable.
2. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Power MOS FET connector |
| 2 | Power MOS FET |

4. Install in the reverse order of removal.

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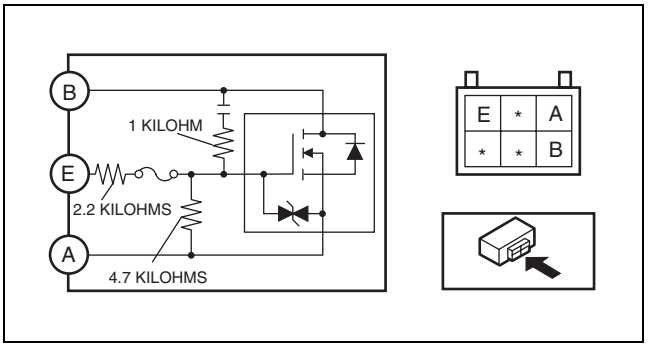
## POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) INSPECTION

id074000800300

1. Verify that the resistance between the terminals of the power MOS FET is as shown in the table.
   - If there is any malfunction, replace the power MOS FET.

| Tester lead | | Resistance (kilohm) |
|---|---|---|
| + | − | |
| A | B | ∞ |
| A | E | 6.9 |
| B | A | Continuity |
| B | E | Continuity |
| E | A | 6.9 |
| E | B | ∞ |

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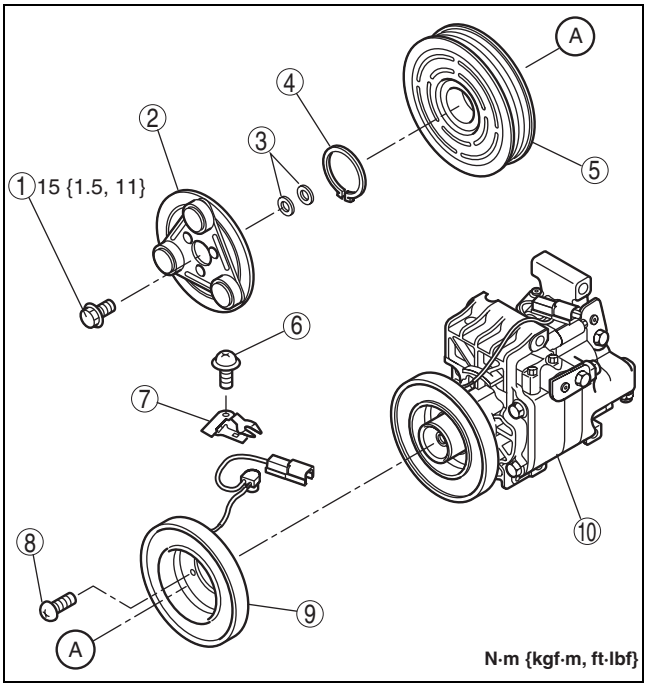
## MAGNETIC CLUTCH DISASSEMBLY/ASSEMBLY

id074000800400

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt<br>(See 07-40-5 Bolt Removal/Installation Note.) |
| 2 | Pressure plate |
| 3 | Shim |
| 4 | Snap ring<br>(See 07-40-6 Snap Ring Installation Note.) |
| 5 | A/C compressor pulley |
| 6 | Screw<br>(See 07-40-6 Screw Installation Note.) |
| 7 | Clamp<br>(See 07-40-6 Clamp Installation Note.) |
| 8 | Screw<br>(See 07-40-6 Screw Installation Note.) |
| 9 | Stator and thermal protector<br>(See 07-40-5 Stator and Thermal Protector Removal Note.)<br>(See 07-40-6 Stator and Thermal Protector Installation Note.) |
| 10 | A/C compressor body |

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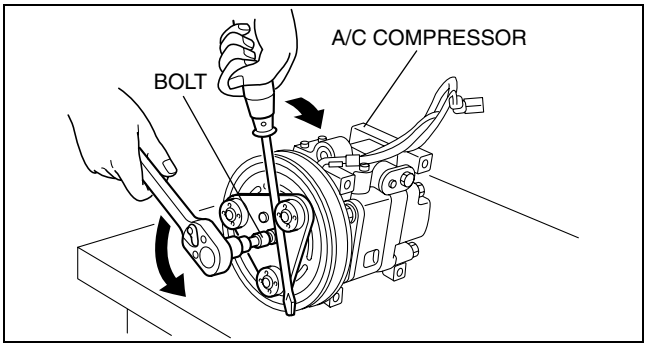
2. Assemble in the reverse order of disassembly.
3. Adjust the magnetic clutch clearance. (See 07-40-6 MAGNETIC CLUTCH ADJUSTMENT.)

### Bolt Removal/Installation Note

1. When removing or installing the bolt, hold the pressure plate in place as shown in the figure.
2. When installing a new A/C compressor body, replace the bolt.

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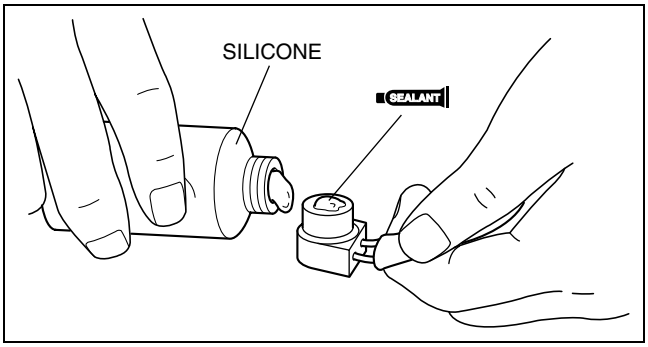
### Stator and Thermal Protector Removal Note

1. After removing the stator and thermal protector, completely remove the silicone adhering to the A/C compressor side.

**Stator and Thermal Protector Installation Note**

1. Apply **approx. 1 g {0.04 oz}** of silicone (Shin-Etsu Silicone KE-347W or similar) to the contact surface of the thermal protector, then thoroughly install it onto the A/C compressor, leaving no gaps.

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**Screw Installation Note**

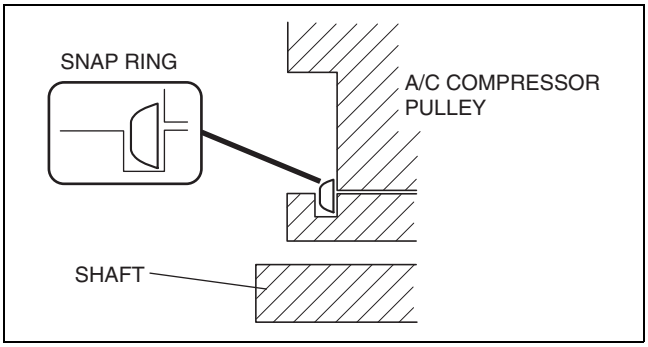
1. When installing a new stator and thermal protector, replace the screw.

**Clamp Installation Note**

1. When installing a new stator and thermal protector, replace the clamp.

**Snap Ring Installation Note**

1. When installing a new pressure plate, A/C compressor pulley, stator, or A/C compressor body, replace the snap ring.

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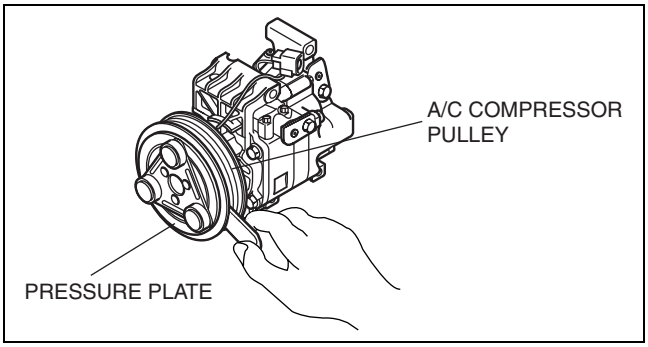
**MAGNETIC CLUTCH ADJUSTMENT**

id074000800500

1. Measure the clearance around the entire circumference between the pressure plate and A/C compressor pulley using a thickness gauge.

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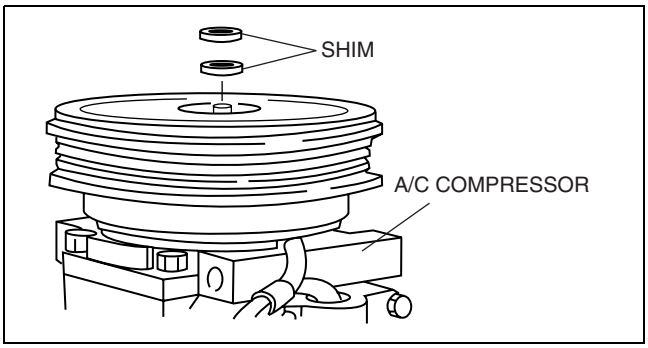
2. Verify that the clearance is within the specification.
   - If not within the specification, remove the pressure plate and adjust the clearance by changing the shim (**0.2 mm {0.008 in}, 0.5 mm {0.02 in}**) or the number of shims.

   **Magnetic clutch clearance**
   **0.3— 0.5 mm {0.012— 0.019 in}**

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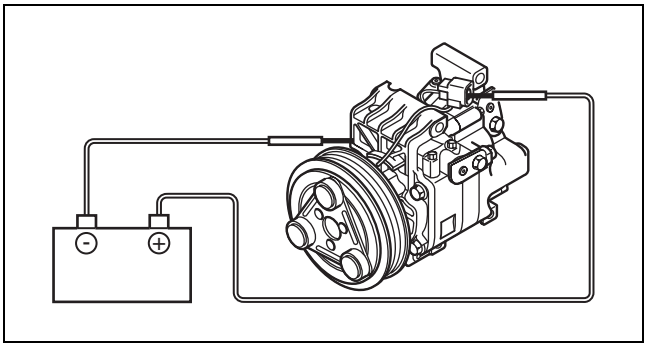
## MAGNETIC CLUTCH INSPECTION

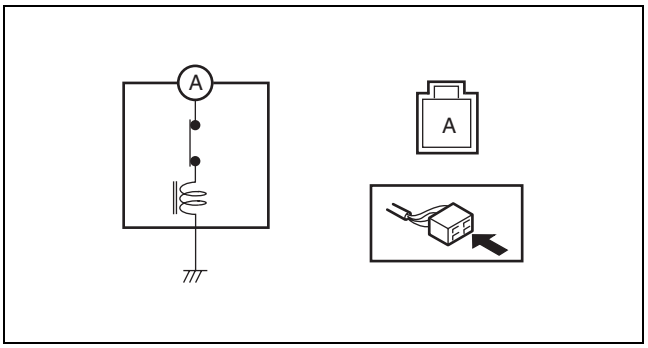
id074000800600

1. Connect battery positive voltage to terminal A of magnetic clutch and ground to A/C compressor body.




A6E8540W015

2. Verify that the magnetic clutch operates.
   - If there is any malfunction, replace the stator and thermal protector.




A6E8540W016

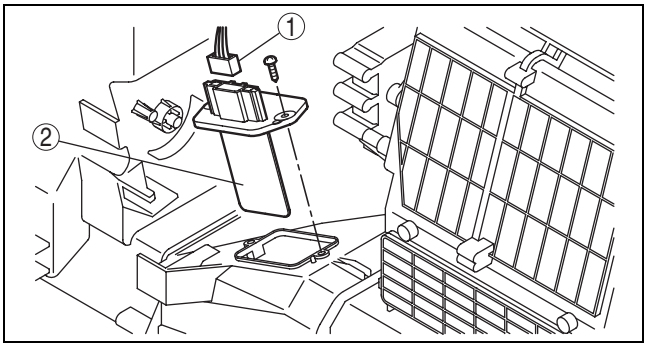
## RESISTOR REMOVAL/INSTALLATION

id074000800700

1. Disconnect the negative battery cable.
2. Remove the glove compartment. (See 07-40-7 RESISTOR REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Resistor connector |
| 2 | Resistor |

4. Install in the reverse order of removal.



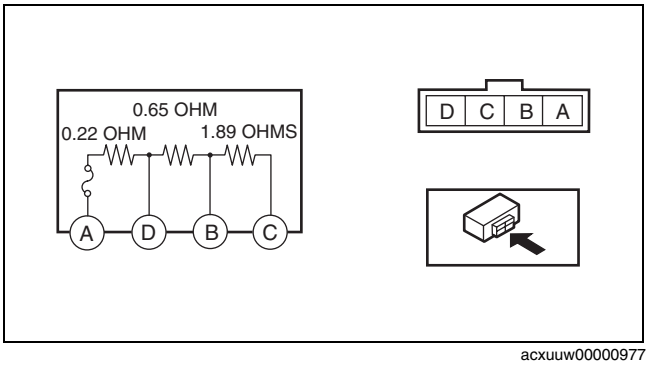

acxuuw00000718

## RESISTOR INSPECTION

id074000800800

1. Verify that the resistance between the terminals of the resistor is as shown in the table.
   - If not as specified, replace the resistor.

| Terminal | Resistance (ohm) |
|---|---|
| A— D | 0.22 |
| A— B | 0.87 |
| A— C | 2.76 |




acxuuw00000977

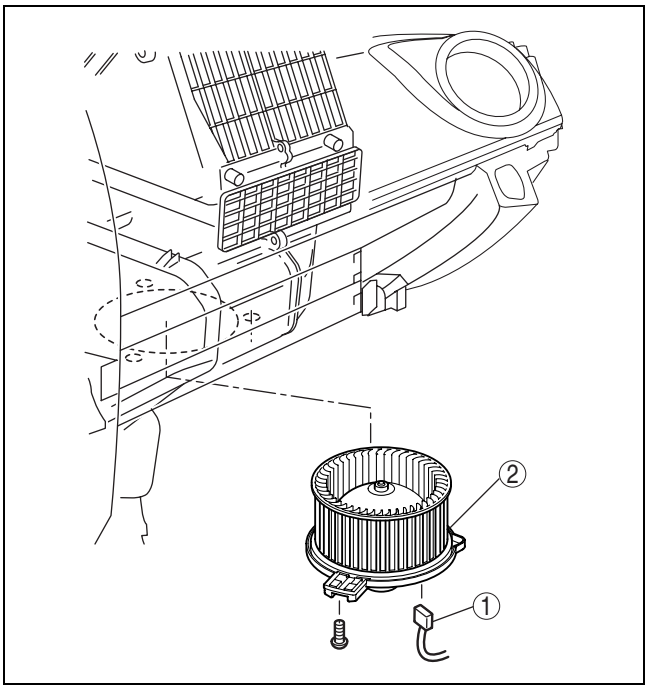
## BLOWER MOTOR REMOVAL/INSTALLATION

id074000800900

1. Disconnect the negative battery cable.
2. Remove the dashboard under cover (passenger's side).
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Blower motor connector |
| 2 | Blower motor |

4. Install in the reverse order of removal.

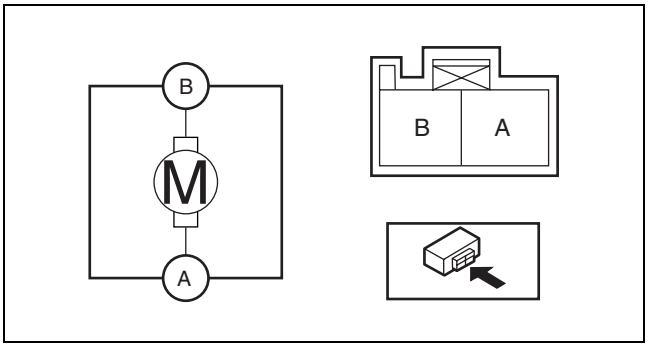



acxuuw00000720

## BLOWER MOTOR INSPECTION

id074000801000

1. Connect battery positive voltage to terminal B and ground to terminal A of the blower motor and verify its operation.
   - If not as specified, replace the blower motor.




acxuuw00000721

## EVAPORATOR TEMPERATURE SENSOR REMOVAL/INSTALLATION

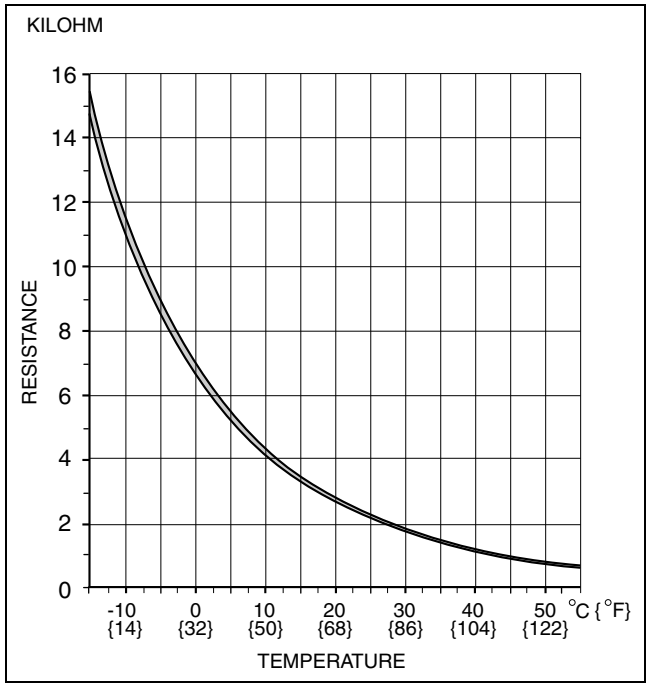
id074000801100

1. Remove the evaporator temperature sensor from the A/C unit. (See 07-11-4 A/C UNIT DISASSEMBLY/ ASSEMBLY.)

## EVAPORATOR TEMPERATURE SENSOR INSPECTION

id074000801200

1. Set the fan speed MAX HI.
2. Set the temperature control at MAX COLD (Turn the left).
3. Turn the A/C switch off.
4. Set the RECIRCULATE mode.
5. Close all doors and windows.
6. Wait for **5 min.**
7. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
8. Disconnect the evaporator temperature sensor connector.
9. Measure the temperature at the blower inlet.
10. Measure the resistance between terminals of the evaporator temperature sensor.
    - If the resistance is not as shown in the graph, replace the evaporator temperature sensor.




acxuuw00000978

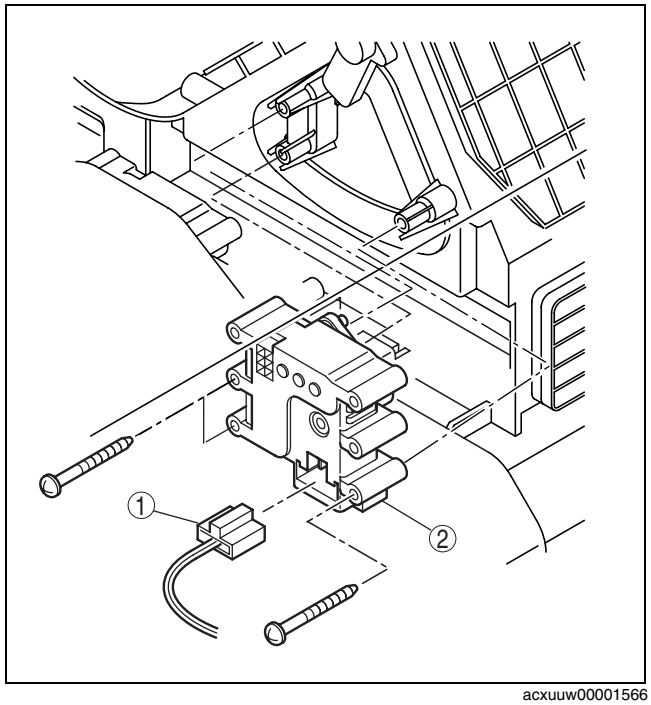
## AIR INTAKE ACTUATOR REMOVAL/INSTALLATION

id074000801400

1. Disconnect the negative battery cable.
2. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Air intake actuator connector |
| 2 | Air intake actuator |

4. Install in the reverse order of removal.



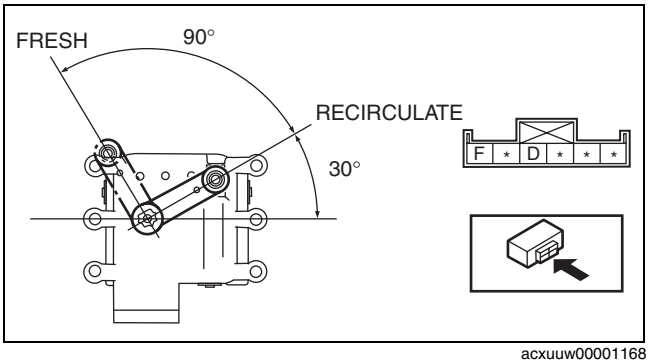

acxuuw00001566

### AIR INTAKE ACTUATOR INSPECTION

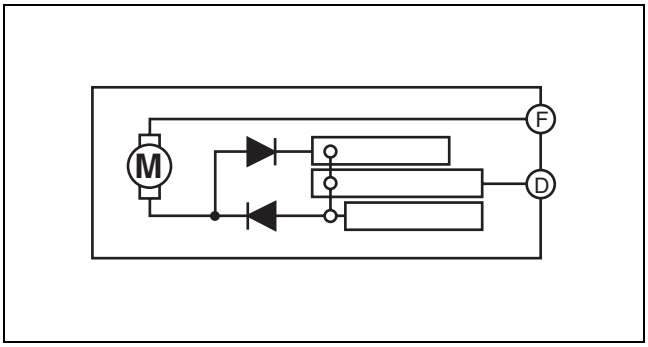
id074000801500

1. Connect battery positive voltage to terminal D or F and ground to terminal F or D of the air intake actuator.
2. Verify that the air intake actuator operates as shown below.
   - If there is any malfunction, replace the air intake actuator.

| Connection | | Movement |
|---|---|---|
| B+ | GND | |
| D | F | RECIRCULATE → FRESH |
| F | D | FRESH → RECIRCULATE |




acxuuw00001168




acxuuw00002306

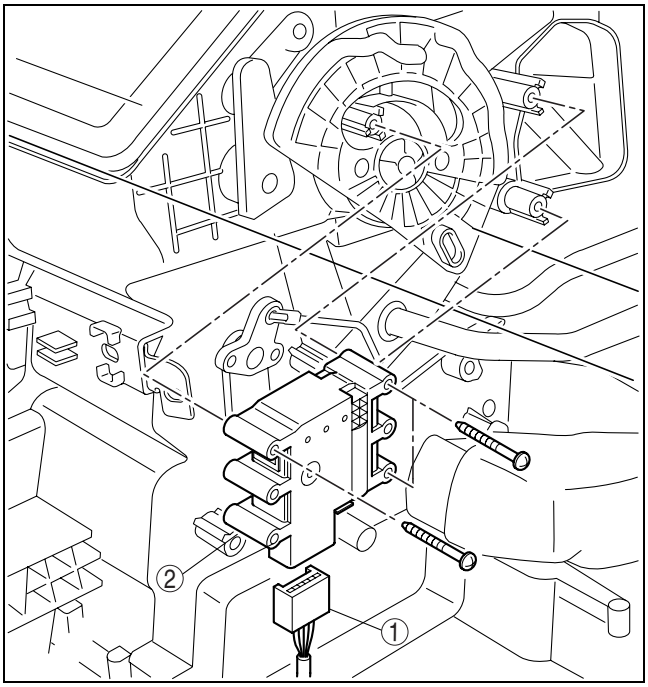
### AIRFLOW MODE ACTUATOR REMOVAL/INSTALLATION

id074000801600

1. Disconnect the negative battery cable.
2. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Airflow mode actuator connector |
| 2 | Airflow mode actuator |

4. Install in the reverse order of removal.




acxuuw00001568

## AIRFLOW MODE ACTUATOR INSPECTION

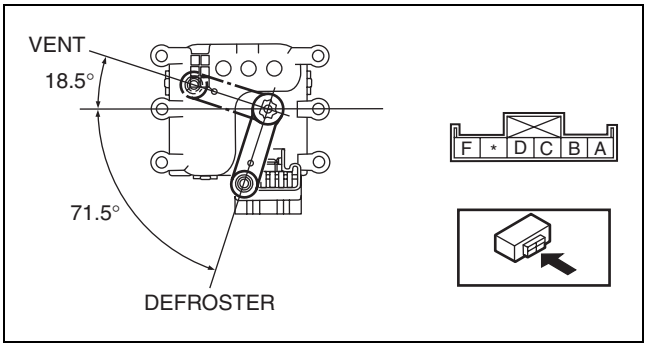
id074000801700

**Caution**

- **If the lever position exceeds the operation range shown in the figure, the circuit in the actuator could be damaged. Always perform an actuator operation inspection with the lever movement within the range shown in the figure.**

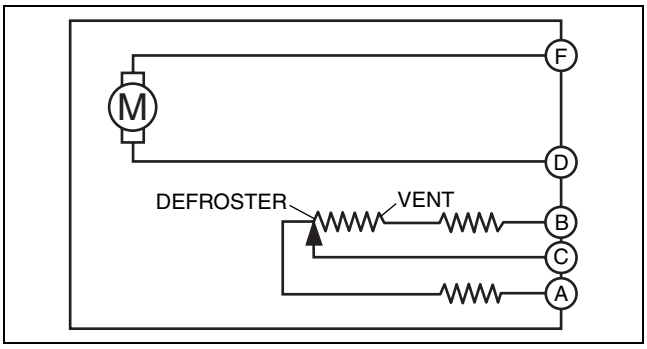
1. Connect battery positive voltage to terminal D or F and ground to terminal F or D of the airflow mode actuator.
2. Verify that the airflow mode actuator operates as shown below.
   - If there is any malfunction, replace the airflow mode actuator.

| Connection | | Movement |
|---|---|---|
| B+ | GND | |
| D | F | DEFROSTER → VENT |
| F | D | VENT → DEFROSTER |

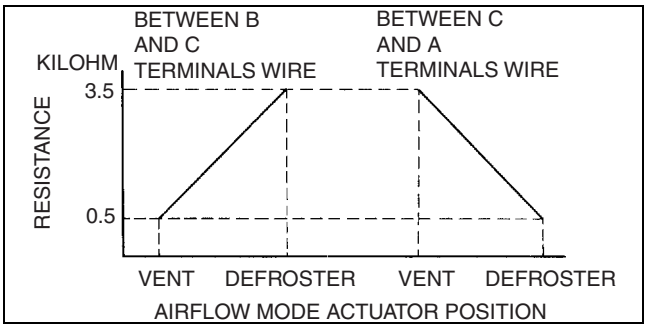



acxuuw00000725

3. Verify that the resistance between the terminals of the airflow mode actuator is as shown in the graph.
   - If there is any malfunction, replace the airflow mode actuator.




acxuuw00000726




acxuuw00000727

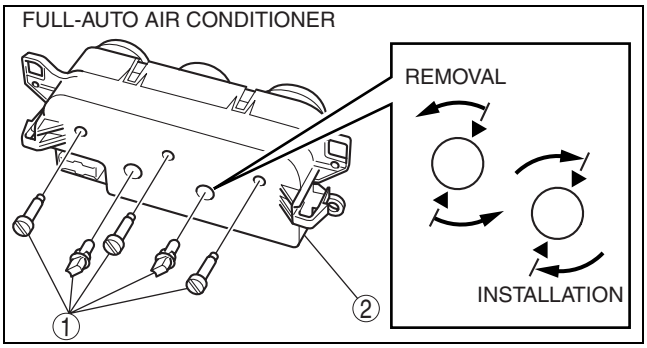
## CLIMATE CONTROL UNIT DISASSEMBLY/ASSEMBLY

id074000802000

**Full-auto Air Conditioner**

Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Illumination bulb |
| 2 | Body |

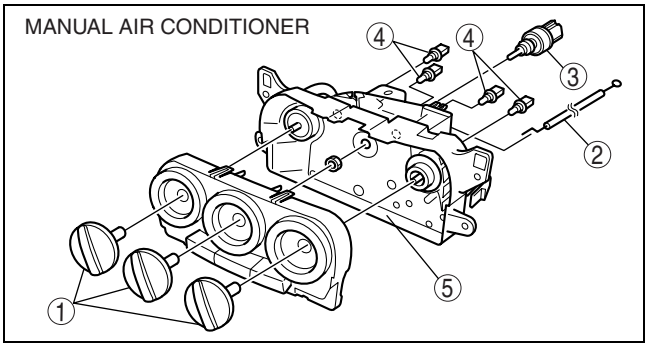



acxuuw00001839

**Manual Air Conditioner**

Disassemble in the order indicated in the table.

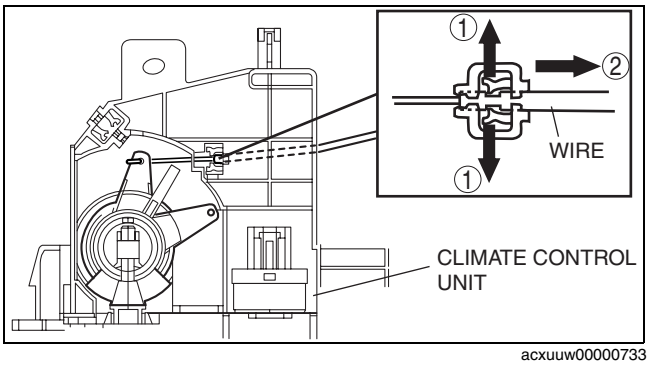
| | |
|---|---|
| 1 | Knob |
| 2 | Air mix wire<br>(See 07-40-12 Wire Disassembly Note.)<br>(See 07-40-12 Wire Assembly Note.) |
| 3 | Airflow volume control dial |
| 4 | Illumination bulb |
| 5 | Body |




acxuuw00000732

**Wire Disassembly Note**

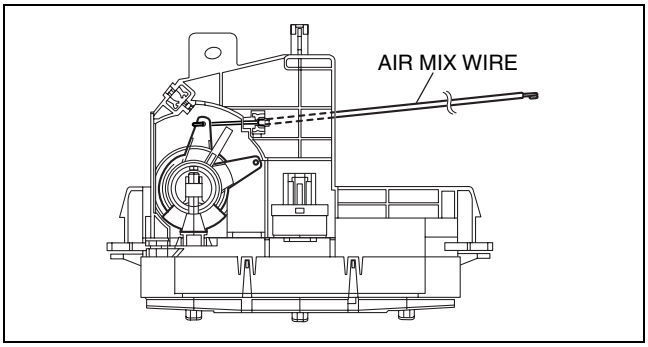
1. Disassemble the wire in the shown in the figure.




acxuuw00000733

**Wire Assembly Note**

1. Assemble the wire to the position as shown in the figure.



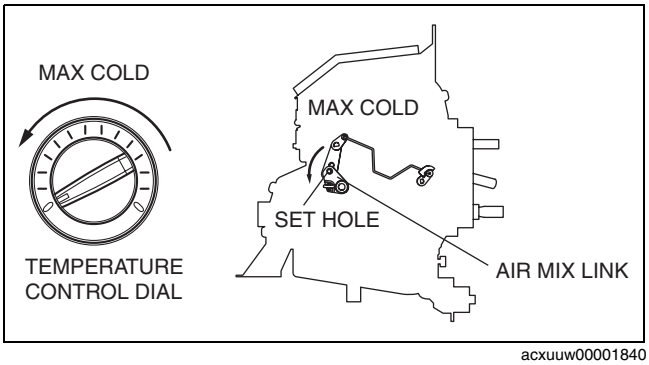

acxuuw00000734

**CLIMATE CONTROL UNIT WIRE ADJUSTMENT**

id074000802100

**Air Mix Wire**

1. Set the temperature control dial to max cold.
2. Set the air mix link to max cold in the direction shown by the arrow and insert a screwdriver at the set hole.
3. Connect the air mix wire to the air mix link.
4. Clamp the air mix wire to the wire clamp.
5. Verify that the temperature control dial rotates at full stroke.



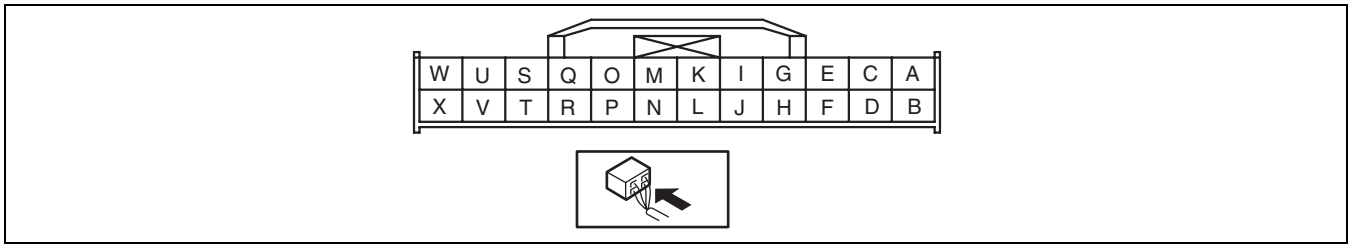

acxuuw00001840

### CLIMATE CONTROL UNIT INSPECTION [FULL-AUTO AIR CONDITIONER]

id074000803400

1. Remove the climate control unit. (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].)
2. Install the audio unit. (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
3. Connect the climate control unit connector.
4. Connect the negative (-) lead of the tester to body ground.
5. Turn the ignition switch to the ON position.
6. By inserting the positive (+) lead of the tester into each climate control unit terminal, measure the voltage according to the terminal voltage table.
   - If there is any malfunction, inspect the parts under “Inspection item (s)”.
     — If the parts under “Inspection item (s)” are found to be normal (except for terminal T), replace the climate control unit.
     — For terminal T, first try replacing the power MOS FET. If there is still any malfunction, replace the climate control unit.

**Terminal Voltage Table (Reference)**



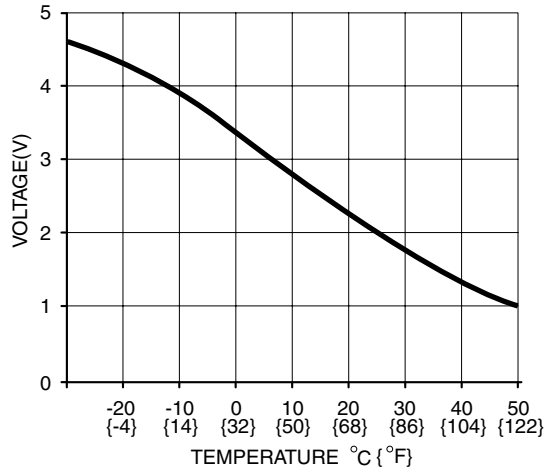

acxuuw00000985

| Terminal | Signal name | Connected to | Measurement condition | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|
| A | Communication | — | — | — | — |
| B | Communication | — | — | — | — |
| C | Sensor GND | • Ambient temperature sensor<br>• Passenger compartment temperature sensor<br>• Evaporator temperature sensor<br>• Air mix actuator<br>• Airflow mode actuator | Under any condition | 1.0 or less | • Climate control unit: terminal voltage (D) |
| D | GND | Body ground | Under any condition | 1.0 or less | • Wiring harness: continuity (Climate control unit— GND: D— GND) |
| E | Solar radiation sensor input | Solar radiation sensor | fluorescent light shined directly on the solar radiation sensor | 0.1—0.45 | • Wiring harness: continuity (Climate control unit—solar radiation sensor: E—B, J—A)<br>• Climate control unit: terminal voltage (J)<br>• Solar radiation sensor |
| | | | Blocking light to solar radiation sensor | 0.1 or less | |
| F | Evaporator temperature sensor input | Evaporator temperature sensor | Compared with temperature detected by evaporator temperature sensor | Refer to graph 3 | • Wiring harness: continuity (Climate control unit—evaporator temperature sensor: F—B, C—A)<br>• Wiring harness: short circuit (Climate control unit—evaporator temperature sensor: F—B)<br>• Evaporator temperature sensor<br>• Climate control unit: terminal voltage (D, M) |

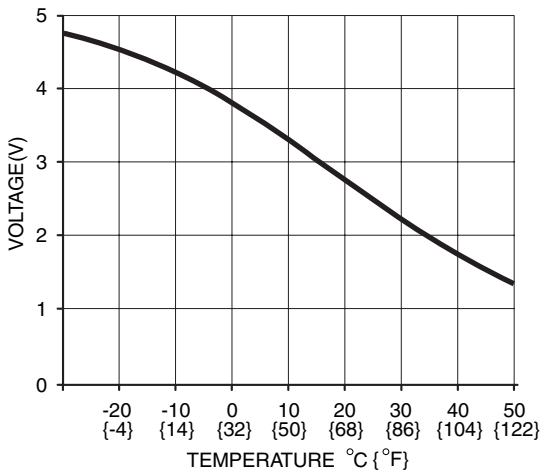
| Terminal | Signal name | Connected to | Measurement condition | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|
| G | Rear window defroster switch | Rear window defroster relay | Rear window defroster switch OFF | B+ | • Wiring harness: continuity, short circuit (Climate control unit— rear window defroster relay: G— E)<br>• Rear window defroster relay |
| | | | Rear window defroster switch ON | 0.06 | • Climate control unit: terminal voltage (D, M)<br>• Climate control unit |
| H | Passenger compartment temperature sensor input | Passenger compartment temperature sensor | Compared with temperature detected by passenger compartment temperature sensor | Refer to graph 2 | • Wiring harness: continuity (Climate control unit—passenger compartment temperature sensor: H—B, C—A)<br>• Wiring harness: short circuit (Climate control unit—passenger compartment temperature sensor: H—B)<br>• Passenger compartment temperature sensor<br>• Climate control unit: terminal voltage (D, M) |
| I | Motor operation | Air intake actuator | Moving towards RECIRCULATE | 10.75 | • Wiring harness: continuity, short circuit (Climate control unit— air intake actuator: I— F, K— D)<br>• Air intake actuator |
| | | | Moving towards FRESH | 0.72 | |
| J | +5V | • Air mix actuator<br>• Airflow mode actuator<br>• Solar radiation sensor | IG SW ON | 5.11 | • Wiring harness: short circuit (Climate control unit—air mix actuator, airflow mode actuator, Solar radiation sensor: J—A, B, A)<br>• Air mix actuator<br>• Airflow mode actuator<br>• Solar radiation sensor<br>• Climate control unit: terminal voltage (D, M) |
| | | | IG SW OFF | 0.01 | • Climate control unit replacement |
| K | Motor operation | Air intake actuator | Moving towards FRESH | 10.89 | • Wiring harness: continuity, short circuit (Climate control unit— air intake actuator: K— D, I— F)<br>• Air intake actuator |
| | | | Moving towards RECIRCULATE | 0.72 | |
| L | Ambient temperature sensor input | Ambient temperature sensor | Compared with temperature detected by ambient temperature sensor | Refer to graph 1 | • Wiring harness: continuity (Climate control unit—ambient temperature sensor: C—A, L—B)<br>• Wiring harness: short circuit (Climate control unit—ambient temperature sensor: L—B)<br>• Ambient temperature sensor<br>• Climate control unit: terminal voltage (D, M) |
| M | IG2 | A/C 10 A fuse | IG SW ON | B+ | • Wiring harness: continuity, short circuit (Climate control unit— fuse: M— A/C 10 A)<br>• A/C 10 A fuse |
| | | | IG SW OFF | 1.0 or less | • Wiring harness: continuity, short circuit (Climate control unit— fuse: M— A/C 10 A) |
| N | Potentiometer input | Air mix actuator | Set temperature at MAX COLD | 0.72 | • Wiring harness: continuity, short circuit (Climate control unit— air mix actuator: N— C)<br>• Air mix actuator<br>• Climate control unit: terminal voltage (J) |
| | | | Set temperature at MAX HOT | 4.42 | |
| O | Motor operation | Airflow mode actuator | Moving towards VENT | 10.39 | • Wiring harness: continuity, short circuit (Climate control unit— airflow mode actuator: O— D, Q— F)<br>• Airflow mode actuator |
| | | | Moving towards DEFROSTER | 0.74 | |

| Terminal | Signal name | Connected to | Measurement condition | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|
| P | Potentiometer input | Airflow mode actuator | VENT | 4.41 | • Wiring harness: continuity, short circuit (Climate control unit— airflow mode actuator: P— C)<br>• Airflow mode actuator<br>• Climate control unit: terminal voltage (J) |
| | | | BILEVEL | 3.54 | |
| | | | HEAT | 2.60 | |
| | | | HEAT/DEF | 1.69 | |
| | | | DEFROSTER | 0.74 | |
| Q | Motor operation | Airflow mode actuator | Moving towards DEFROSTER | 9.98 | • Wiring harness: continuity, short circuit (Climate control unit— airflow mode actuator: Q— F, O— D)<br>• Airflow mode actuator |
| | | | Moving towards VENT | 0.70 | |
| R | B+ | ROOM 15 A fuse | Under any condition | B+ | • Wiring harness: continuity, short circuit (Climate control unit— fuse: R— ROOM 15 A)<br>• ROOM 15 A fuse |
| S | Motor operation | Air mix actuator | Moving towards HOT | 10.91 | • Wiring harness: continuity, short circuit (Climate control unit— air mix actuator: S— F, U— D)<br>• Air mix actuator |
| | | | Moving towards COLD | 0.70 | |
| T | Blower motor feed back | • Blower motor<br>• Power MOS FET | Fan stopped | 11.84 | 1. Wiring harness: continuity, short circuit (Climate control unit— blower motor: T— A) (Climate control unit— power MOS FET: T— B, V— E) (Blower motor— blower relay: B— A) (Blower relay— fuse: D— BLOWER 40 A)<br>2. Wiring harness: continuity (Power MOS FET— body ground: A— GND) (Blower relay— ground: A— GND)<br>3. Power MOS FET<br>4. Blower motor<br>5. Blower relay<br>6. BLOWER 40 A fuse<br>7. A/C 10 A fuse<br>8. Power MOS FET replacement |
| | | | Fan: manual LO | 7.29 | |
| | | | Fan: manual HI | 0.20 | |
| U | Motor operation | Air mix actuator | Moving towards COLD | 10.96 | • Wiring harness: continuity, short circuit (Climate control unit— air mix actuator: U— D, S— F)<br>• Air mix actuator |
| | | | Moving towards HOT | 0.70 | |
| V | Blower fan speed control | Power MOS FET | Fan stopped | 0.07 | 1. Climate control unit: terminal voltage (T) |
| | | | Fan: manual LO | 3.10 | |
| | | | Fan: manual HI | 7.23 | |
| W | TNS signal | TNS relay | Headlight switch OFF | 1.0 or less | • Wiring harness: short circuit (Climate control unit— TNS relay: W— C)<br>• TNS relay<br>• Headlight switch |
| | | | Headlight switch ON | B+ | • Wiring harness: continuity, short circuit (Climate control unit— TNS relay: W— C)<br>• TNS relay<br>• Headlight switch |
| X | Illumination control | Instrument cluster | Headlight switch ON and panel light control switch at max | 0.31 | • Wiring harness: continuity (Climate control unit— instrument cluster: X— 2H) (Instrument cluster— body ground: 2A— GND)<br>• Instrument cluster |
| | | | Headlight switch ON and panel light control switch at min | 9.56 | • Wiring harness: short circuit (Climate control unit— instrument cluster: X— 2H) |

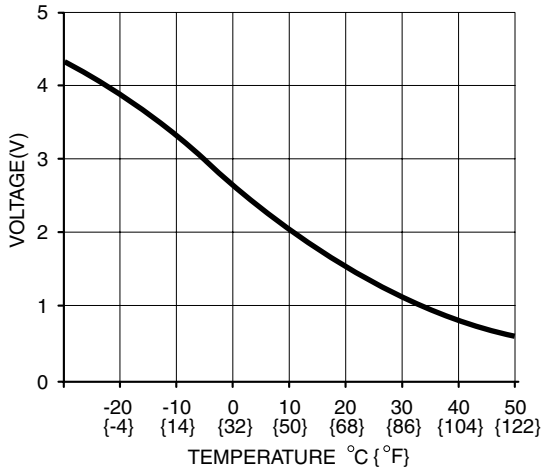
Graph 1 (Ambient temperature sensor)




Graph 2 (Passenger compartment temperature sensor)




Graph 3 (Evaporetor temperature sensor)

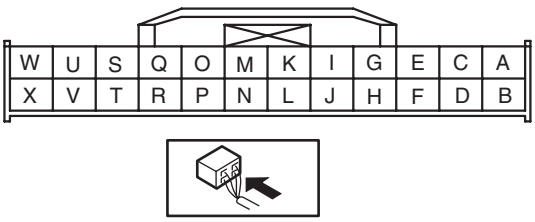



### CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER]

id074000803500

1. Remove the climate control unit. (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].)
2. Disconnect the air mix wire from the climate control unit
3. Install the audio unit. (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
4. Connect the climate control unit connector.
5. Connect the negative (-) lead of the tester to body ground.
6. Turn the ignition switch to the ON position.
7. By inserting the positive (+) lead of the tester into each climate control unit terminal, measure the voltage according to the terminal voltage table.
   - If there is any malfunction, inspect the parts under “Inspection item (s)”.
     — If the parts under “Inspection item (s)” are found to be normal, replace the climate control unit.

**Terminal Voltage Table (Reference)**

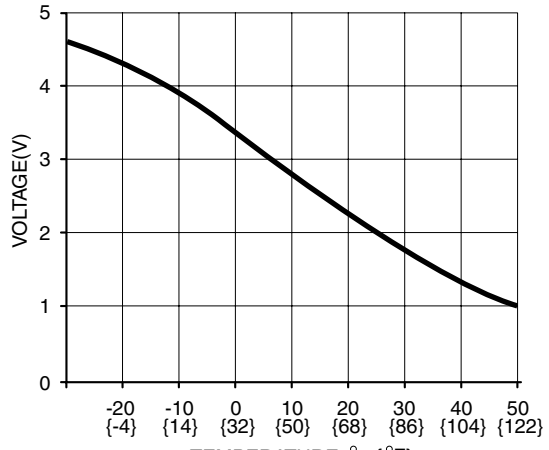



acxuuw00000989

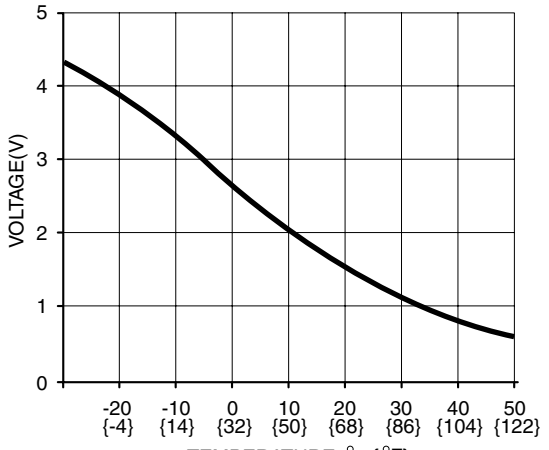
| Terminal | Signal name | Connected to | Measurement condition | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|
| A | Illumination control | Instrument cluster | Headlight switch ON and panel light control switch at max | 0.45 | • Wiring harness: continuity (Climate control unit— instrument cluster: A—2H) (Instrument cluster— body ground: 2A— GND)<br>• Instrument cluster |
| | | | Headlight switch ON and panel light control switch at min | 9.96 | • Wiring harness: short circuit (Climate control unit— instrument cluster: A—2H) |
| B | TNS signal | TNS relay | Headlight switch OFF | 1.0 or less | • Wiring harness: short circuit (Climate control unit— TNS relay: B— C)<br>• TNS relay<br>• Headlight switch |
| | | | Headlight switch ON | B+ | • Wiring harness: continuity, short circuit (Climate control unit— TNS relay: B—C)<br>• TNS relay<br>• Headlight switch |
| C | — | — | — | — | — |
| D | — | — | — | — | — |
| E | +5V | Airflow mode actuator | IG SW ON | 4.91 | • Wiring harness: short circuit (Climate control unit—airflow mode actuator: E—B)<br>• Airflow mode actuator<br>• Climate control unit: terminal voltage (R, L) |
| | | | IG SW OFF | 1.0 or less | • Climate control unit replacement |
| F | FAN ON/OFF | Airflow volume control dial | Airflow volume control dial ON | 0.06 | • Wiring harness: (Climate control unit—airflow volume control dial: F— C)<br>• Airflow volume control dial |
| | | | Airflow volume control dial OFF | 12.18 | • Wiring harness: continuity (Climate control unit— airflow volume control dial: F— C)<br>• Climate control unit: terminal voltage (R)<br>• Airflow volume control dial |
| G | Potentiometer input | Airflow mode actuator | VENT | 4.20 | • Wiring harness: continuity, short circuit (Climate control unit— airflow mode actuator: G— C)<br>• Airflow mode actuator<br>• Climate control unit: terminal voltage (E) |
| | | | BILEVEL | 3.34 | |
| | | | HEAT | 2.44 | |
| | | | HEAT/DEF | 1.56 | |
| | | | DEFROSTER | 0.68 | |
| H | Rear window defroster switch | Rear window defroster relay | Rear window defroster switch OFF | B+ | • Wiring harness: continuity, short circuit (Climate control unit— rear window defroster relay: H— E)<br>• Rear window defroster relay |
| | | | Rear window defroster switch ON | 0.06 | • Climate control unit: terminal voltage (L, R)<br>• Climate control unit: |
| I | Evaporator temperature sensor input | Evaporator temperature sensor | Compared with temperature detected by evaporator temperature sensor | Refer to graph 2 | • Wiring harness: continuity (Climate control unit—evaporator temperature sensor: I—B, K—A)<br>• Wiring harness: short circuit (Climate control unit—evaporator temperature sensor: I—B)<br>• Evaporator temperature sensor<br>• Climate control unit: terminal voltage (L, R) |
| J | A/C | BCM | A/C switch ON, airflow volume control dial at 1st | 0.03 | • Wiring harness: continuity (Climate control unit— BCM: J— 3V)<br>• BCM |
| | | | A/C switch OFF | 5.02 | • Wiring harness: continuity, short circuit (Climate control unit— BCM: J— 3V) |

| Terminal | Signal name | Connected to | Measurement condition | Voltage (V) | Inspection item (s) |
|---|---|---|---|---|---|
| K | Sensor GND | • Evaporator temperature sensor<br>• Ambient temperature sensor<br>• Airflow mode actuator | Under any condition | 1.0 or less | • Climate control unit: terminal voltage (L) |
| L | GND | Body ground | Under any condition | 1.0 or less | • Wiring harness: continuity (Climate control unit— GND: L— GND) |
| M | — | — | — | — | — |
| N | — | — | — | — | — |
| O | — | — | — | — | — |
| P | B+ | ROOM 15 A fuse | Under any condition | B+ | • Wiring harness: continuity, short circuit (Climate control unit— fuse: P— ROOM 15 A)<br>• ROOM 15 A fuse |
| Q | Motor operation | Airflow mode actuator | Moving towards DEFROSTER | 10.60 | • Wiring harness: continuity, short circuit (Climate control unit— airflow mode actuator: Q— F, S— D)<br>• Airflow mode actuator |
| | | | Moving towards VENT | 0.69 | |
| R | IG2 | A/C 10 A fuse | IG SW ON | B+ | • Wiring harness: continuity, short circuit (Climate control unit— fuse: R— A/C 10 A)<br>• A/C 10 A fuse |
| | | | IG SW OFF | 1.0 or less | • Wiring harness: continuity, short circuit (Climate control unit— fuse: R— A/C 10 A) |
| S | Motor operation | Airflow mode actuator | Moving towards VENT | 10.64 | • Wiring harness: continuity, short circuit (Climate control unit— airflow mode actuator: S— D, Q— F)<br>• Airflow mode actuator |
| | | | Moving towards DEFROSTER | 0.68 | |
| T | — | — | — | — | — |
| U | — | — | — | — | — |
| V | Motor operation | Air intake actuator | Moving towards RECIRCULATE | 10.62 | • Wiring harness: continuity, short circuit (Climate control unit— air intake actuator: V— F, X— D)<br>• Air intake actuator |
| | | | Moving towards FRESH | 0.66 | |
| W | Ambient temperature sensor input | Ambient temperature sensor | Compared with temperature detected by ambient temperature sensor | Refer to graph 1 | • Wiring harness: continuity (Climate control unit—ambient temperature sensor: W—B, K—A)<br>• Wiring harness: short circuit (Climate control unit—ambient temperature sensor: W—B)<br>• Ambient temperature sensor<br>• Climate control unit: terminal voltage (L, R) |
| X | Motor operation | Air intake actuator | Moving towards FRESH | 10.64 | • Wiring harness: continuity, short circuit (Climate control unit— air intake actuator: X— D, V— F)<br>• Air intake actuator |
| | | | Moving towards RECIRCULATE | 0.67 | |

Graph 1 (Ambient temperature sensor)




Graph 2 (Evaporetor temperature sensor)

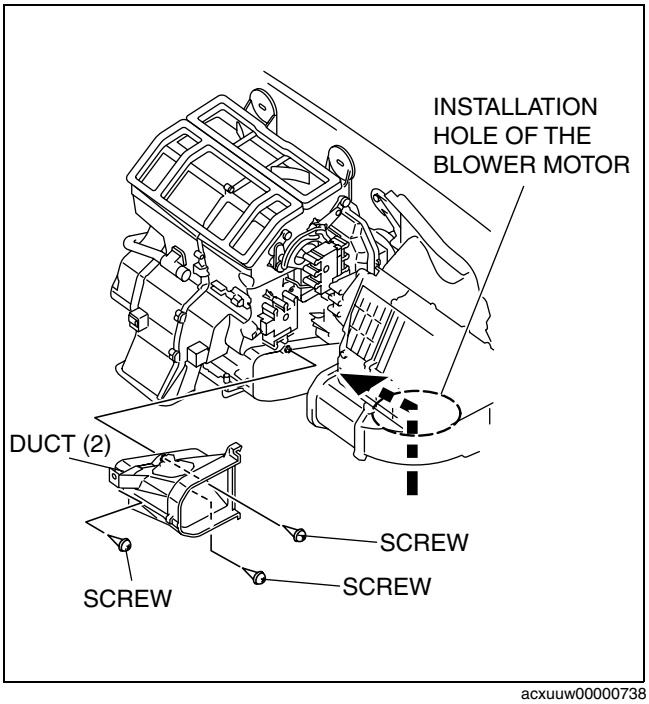



**AIR MIX ACTUATOR REMOVAL/INSTALLATION**

id074000802400

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Dashboard under cover
   (6) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10)Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (11)Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
   (12)Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
   (13)Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (14)Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
   (15)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (16)Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (17)Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (18)Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (19)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (20)A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (21)A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (22)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
3. Remove the blower motor. (See 07-40-8 BLOWER MOTOR REMOVAL/INSTALLATION.)
4. Remove the power MOS FET (Full-auto air conditioner) or resistor. (Manual air conditioner) (See 07-40-4 POWER METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTOR (POWER MOS FET) REMOVAL/INSTALLATION.) (See 07-40-7 RESISTOR REMOVAL/INSTALLATION.)
5. Remove the blower unit installation nuts.
6. Remove the screw securing the duct (2) to the A/C unit, by inserting a phillips screwdriver into the hole made after removing the blower motor.
7. Remove the screw securing the duct (2) to the A/C unit.

8. Remove the duct (2).

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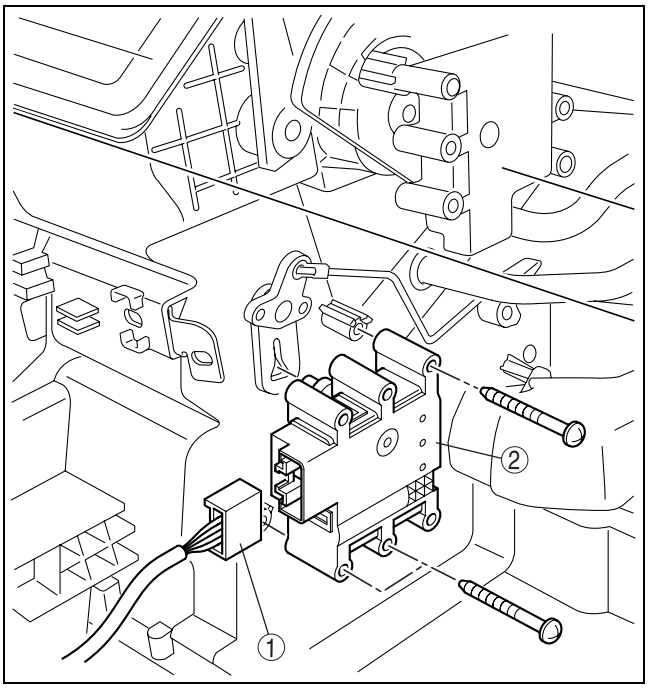
9. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Air mix actuator connector |
| 2 | Air mix actuator |

10. Install in the duct (2).
11. Install the two outer screws, securing the duct (2) to the A/C unit.

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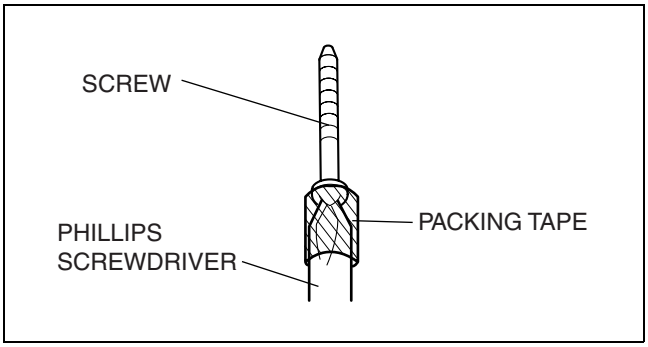
12. Install the screw on the end of the phillips screwdriver with the packing tape.

**Caution**
- **If the packing tape remains in the duct (2), it may become a source of noise. Wind up the packing tape to prevent pinching when tightening the screw.**

13. Install the duct (2) to the A/C unit by inserting a phillips screwdriver, with the screw, into the hole made after removing the blower motor.
14. Pull out the Phillips screwdriver together with the packing tape.
15. Install in the reverse order of removal.

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### AIR MIX ACTUATOR INSPECTION

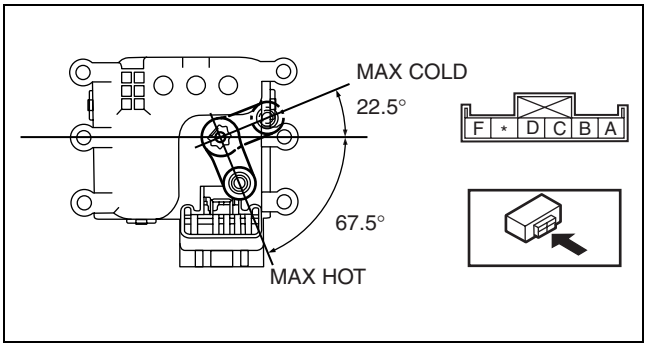
id074000802500

**Caution**

- **If the lever position exceeds the operation range shown in the figure, the circuit in the actuator could be damaged. Always perform an actuator operation with the lever movement within the range shown in the figure.**

1. Connect battery positive voltage to terminal D or F and ground to terminal F or D of the air mix actuator.
2. Verify that the air mix actuator operates as shown below.
   - If there is any malfunction, replace the air mix actuator.

| Connection | | Movement |
|---|---|---|
| B+ | GND | |
| D | F | HOT → COLD |
| F | D | COLD → HOT |

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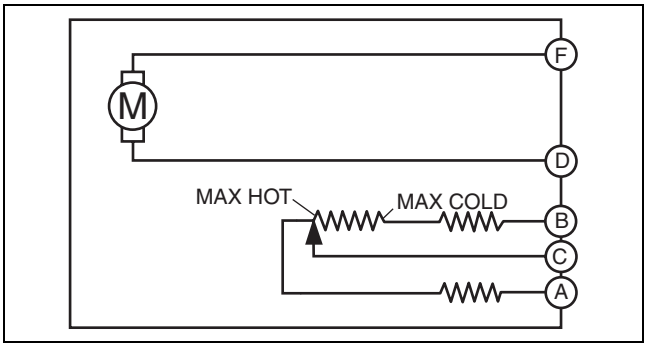
3. Verify that the resistance between the terminals of the air mix actuator are as shown in the graph.
   - If there is any malfunction, replace the air mix actuator.

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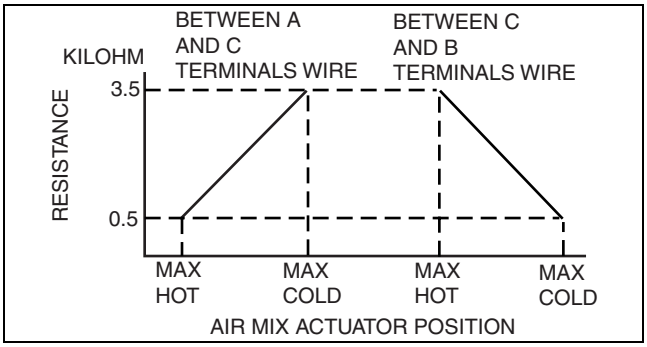


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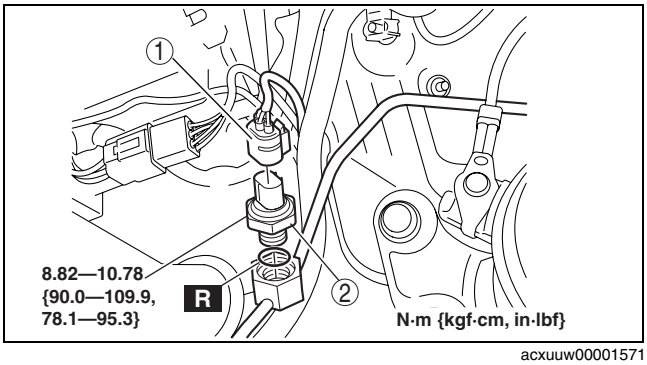
### REFRIGERANT PRESSURE SWITCH REMOVAL/INSTALLATION

id074000802600

1. Disconnect the negative battery cable.
2. Discharge the refrigerant from the system. (See 07-10-6 REFRIGERANT RECOVERY.) (See 07-10-2 REFRIGERANT CHARGING.)
3. Loosen the refrigerant pressure switch using two spanners.
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Refrigerant pressure switch connector |
| 2 | Refrigerant pressure switch<br>(See 07-40-21 Refrigerant Pressure Switch Installation Note.) |

5. Install in the reverse order of removal.
6. Perform the refrigerant system performance test. (See 07-10-6 REFRIGERANT SYSTEM PERFORMANCE TEST.)

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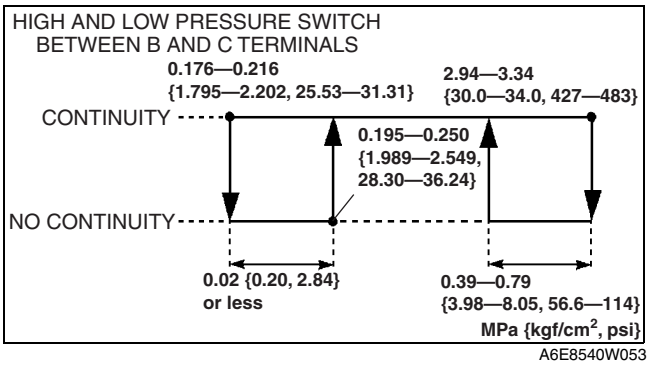
**Refrigerant Pressure Switch Installation Note**

1. Apply compressor oil to O-ring and connect the joint.

## REFRIGERANT PRESSURE SWITCH INSPECTION

id074000802700

1. Install the manifold gauge.
2. Disconnect the refrigerant pressure switch connector.
3. Verify the high-pressure side reading of the manifold gauge and continuity between the terminals of the refrigerant pressure switch.
   - If the continuity is not normal, replace the refrigerant pressure switch.

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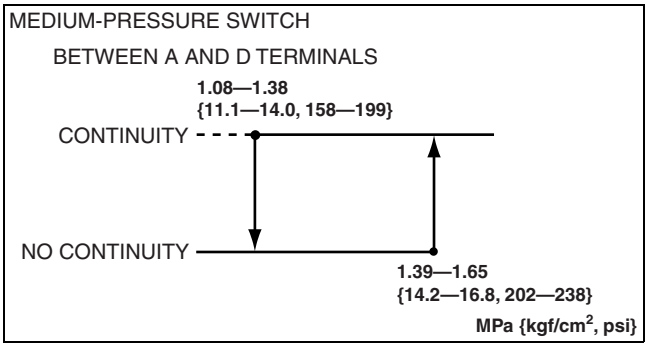
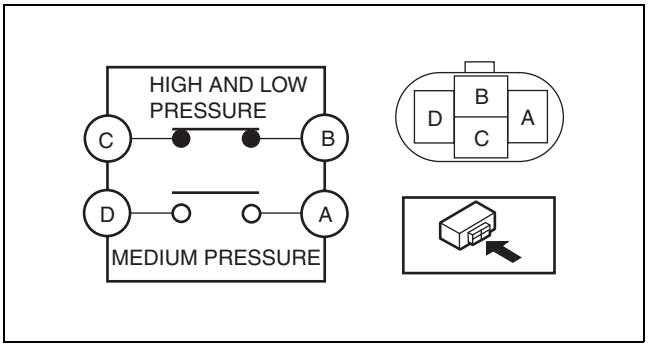



E6U740ZWB105

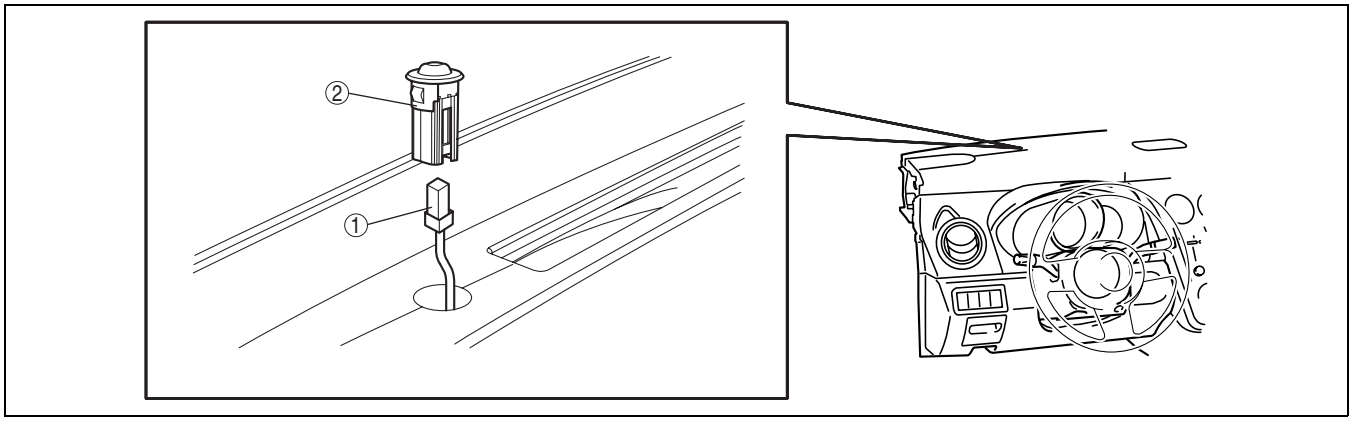



CHU0740W024

## SOLAR RADIATION SENSOR REMOVAL/INSTALLATION

id074000802800

1. Disconnect the negative battery cable.
2. Remove the dashboard under cover (driver's side).
3. Press out the solar radiation sensor with its connector from under the instrument panel.
4. Remove in the order indicated in the table.

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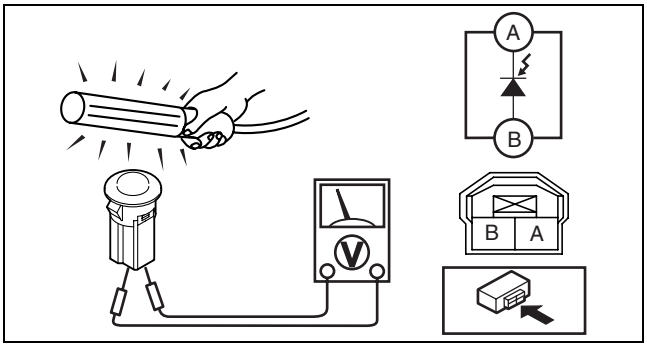
| | |
|---|---|
| 1 | Solar radiation sensor connector |
| 2 | Solar radiation sensor |

5. Install in the reverse order of removal.

## SOLAR RADIATION SENSOR INSPECTION

id074000802900

1. Shine a fluorescent light or expose the solar radiation sensor to natural sunlight.
2. Connect the positive (+) lead to terminal A and the negative (–) lead to terminal B of the solar radiation sensor, and verify that the voltages are as shown in the table.
   - If the voltage is not as specified, replace the solar radiation sensor.

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○—○: Continuity

| Test condition | Voltage (V) |
|---|---|
| Sensor subject to fluorescent light or natural sunlight | 0.1—0.45 |
| Sensor covered by a cloth | 0.1 or less |

acxuuw00002541

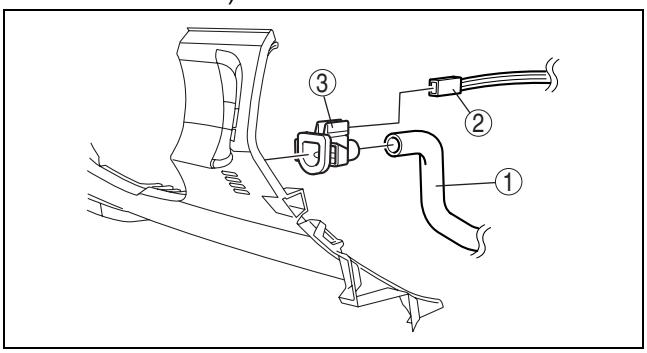
## PASSENGER COMPARTMENT TEMPERATURE SENSOR REMOVAL/INSTALLATION

id074000803000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front scuff plate inner (driver's side). (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (driver's side). (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever. (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Air hose |
| 2 | Passenger compartment temperature sensor connector |
| 3 | Passenger compartment temperature sensor |

4. Install in the reverse order of removal.

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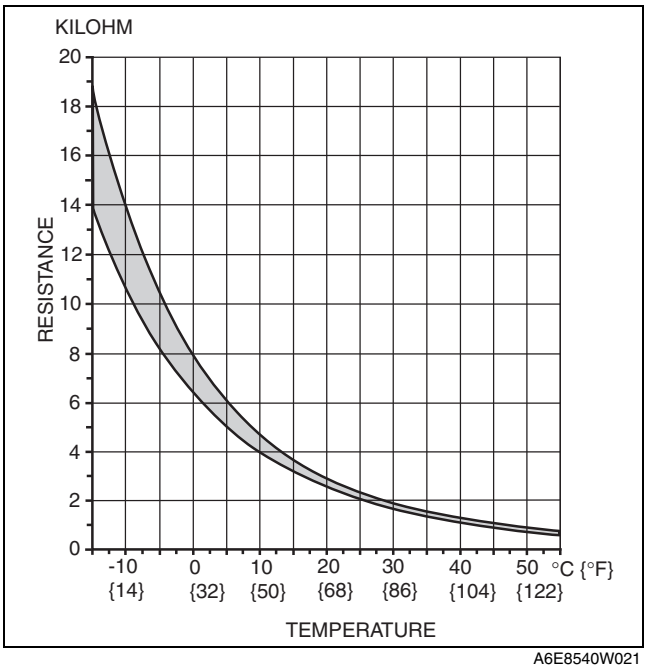
## PASSENGER COMPARTMENT TEMPERATURE SENSOR INSPECTION

id074000803100

1. Measure the temperature around the passenger compartment temperature sensor.
2. Measure the resistance between terminals of the passenger compartment temperature sensor.
   - If the resistance is not as shown in the graph, replace the passenger compartment temperature sensor.

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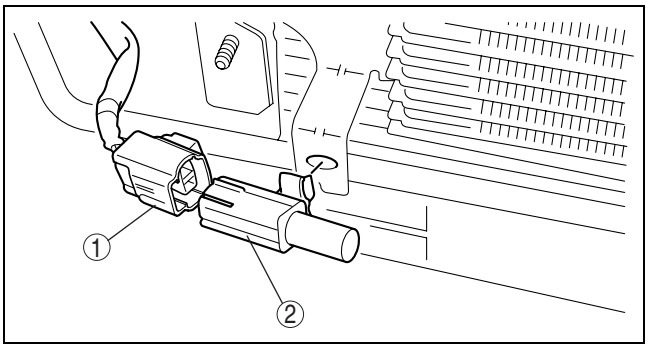
## AMBIENT TEMPERATURE SENSOR REMOVAL/INSTALLATION

id074000803200

1. Disconnect the negative battery cable.
2. Remove the under cover.
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Ambient temperature sensor connector |
| 2 | Ambient temperature sensor |

4. Install in the reverse order of removal.

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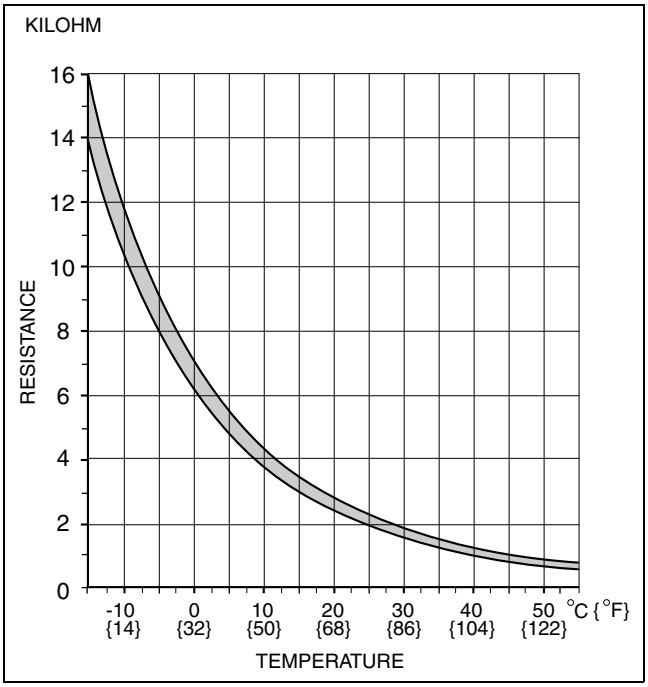
## AMBIENT TEMPERATURE SENSOR INSPECTION

id074000803300

**Note**
- Ambient temperature sensor does not detect a sudden change in temperature sensitively caused by driving or stopping the vehicle to stabilize the control of the full-auto air conditioner. Therefore, the measured value may differ from the original value when the resistance of the ambient temperature sensor is measured immediately after the removal.

1. After removing the ambient temperature sensor, leave it to the inspection place for **30 min or more**.
2. Measure the temperature around the ambient temperature sensor.
3. Measure the resistance between terminals of the ambient temperature sensor.
   - If the resistance is not as shown in the graph, replace the ambient temperature sensor.

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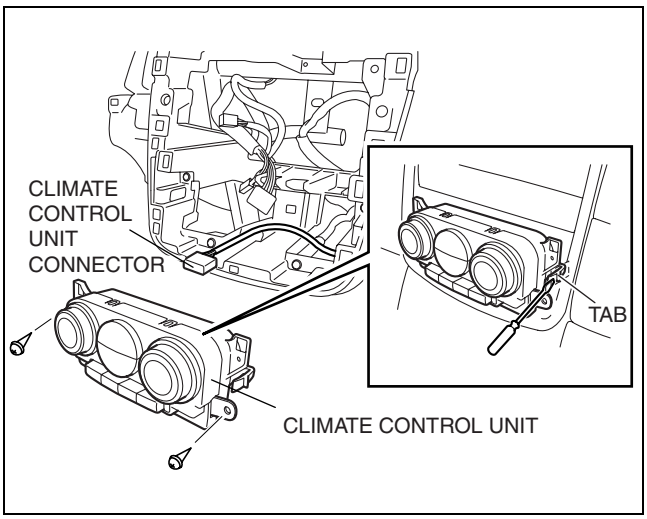
### CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER]

id074000809000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (2) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (3) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (4) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
3. Remove the screws and climate control unit.
4. Release the tab and pull the climate control unit toward you.
5. Disconnect the climate control unit connectors and remove the climate control unit.
6. Install in the reverse order of removal.

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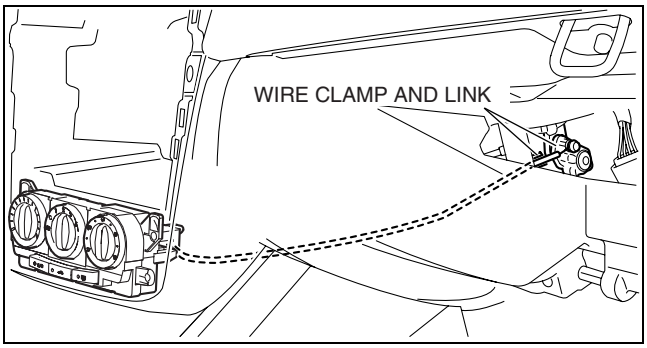
### CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER]

id074000809100

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (4) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (5) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
3. Disconnect the air mix wire from wire clamp and link.
4. Remove the screws and climate control unit.
5. Release the tab and pull the climate control unit toward you.

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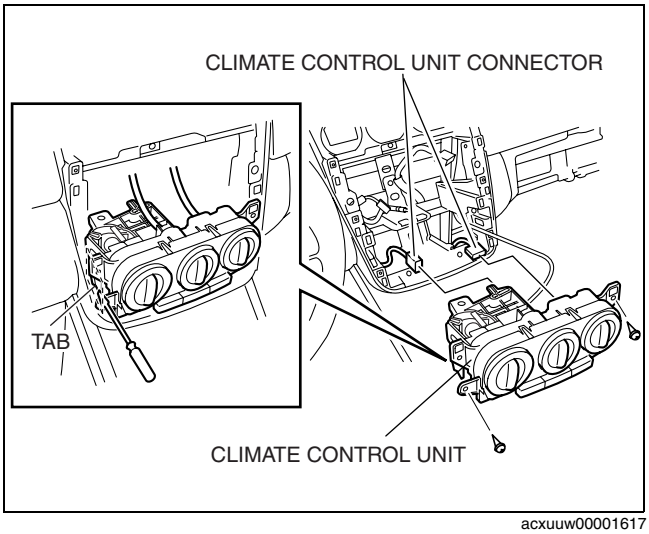
6. Disconnect the climate control unit connectors and remove the climate control unit.

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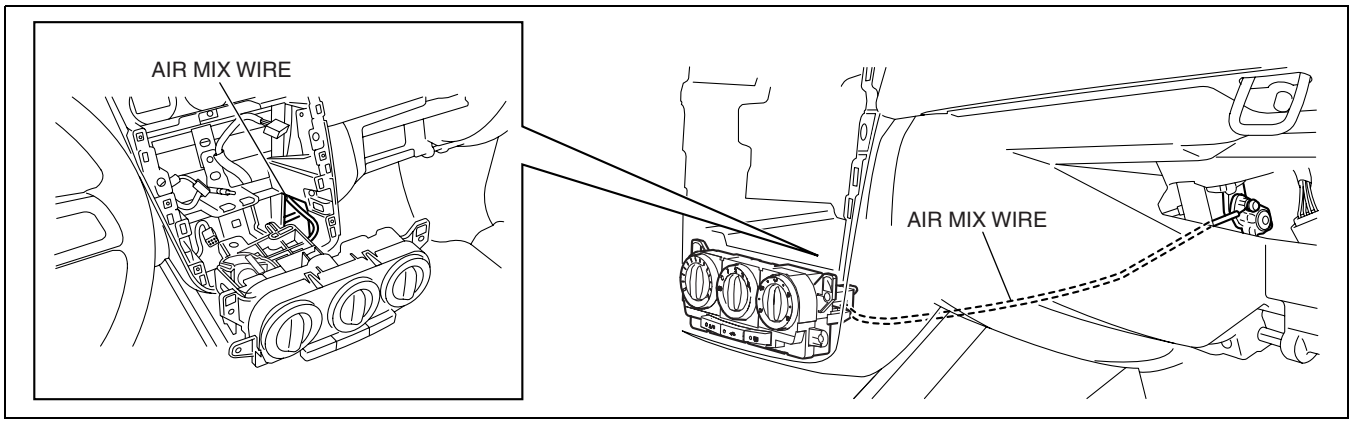
**CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER]**

id074000809200

1. Pass air mix wire through the following routes then connect to A/C unit. (Manual air conditioner)

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2. Install the following parts:
   (1) Climate control unit to the dashboard.
   (2) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (3) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (4) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (5) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
3. Adjust the air mix wire. (See 07-40-12 CLIMATE CONTROL UNIT WIRE ADJUSTMENT.)
4. Install the globe compartment.

**AIRFLOW VOLUME CONTROL DIAL INSPECTION**

id074000809300

1. Remove the climate control unit.
2. Inspect for continuity between the airflow volume control dial terminals using an ohmmeter.
   - If not as specified, replace the airflow volume control dial.

○—○ : Continuity

| Switch position | Terminal | | | | |
|---|---|---|---|---|---|
| | A | C | D | E | F |
| 0 | | | | | |
| 1 | ○ | ○ | | | |
| 2 | ○ | | | ○ | |
| 3 | ○ | | | | ○ |
| 4 | ○ | | ○ | | |

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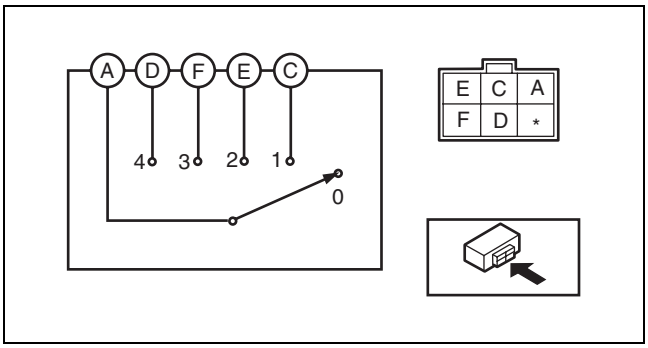


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# 07-50 TECHNICAL DATA

**HVAC TECHNICAL DATA . . . . . 07-50–1**

## HVAC TECHNICAL DATA

id075000800100

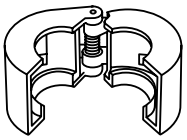
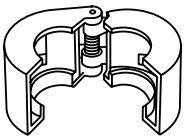
| Item | | | Specification |
|---|---|---|---|
| **REFRIGERANT SYSTEM** | | | |
| Refrigerant | Type | | R-134a |
| | Regular amount (approx. quantity) (g {oz}) | | 500 {17.7} |
| **BASIC SYSTEM** | | | |
| A/C compressor | Lubrication oil | Type | ATMOS GU10 |
| | | Sealed volume (approx. quantity) (ml {cc, fl oz}) | 120 {120, 4.06} |
| **CONTROL SYSTEM** | | | |
| A/C compressor | Magnetic clutch clearance (mm {in}) | | 0.3— 0.5 {0.012— 0.019} |

# 07-60 SERVICE TOOLS

**HVAC SST . . . . . 07-60–1**

## HVAC SST

id076000800100

| | | |
|---|---|---|
| 49 B061 014<br>Spring Lock Coupling Disconnect Tool  | 49 G061 001<br>Spring Lock Coupling Disconnect Tool  | — |

# RESTRAINTS

**08**
SECTION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**AIR BAG SYSTEM . . . . . 08-10**
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**SERVICE TOOLS . . . . . 08-60**


## 08-02 ON-BOARD DIAGNOSTIC


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### FOREWORD

id080200800100

#### Outline

- The OBD (on-board diagnostic) system has the following functions:
  - — Malfunction detection function: Detects malfunctions in the air bag system and outputs DTCs.
  - — Data monitor function: Reads out specific input/output signals and the system status.
- Diagnostic DTCs can be read/cleared using the M-MDS.

**Note**

- When the air bag system is malfunctioning, turn the ignition switch to the ON position to display the current DTC using the air bag system warning light on the instrument cluster. However this light is strictly for reference. Make sure to inspect the system using the M-MDS.

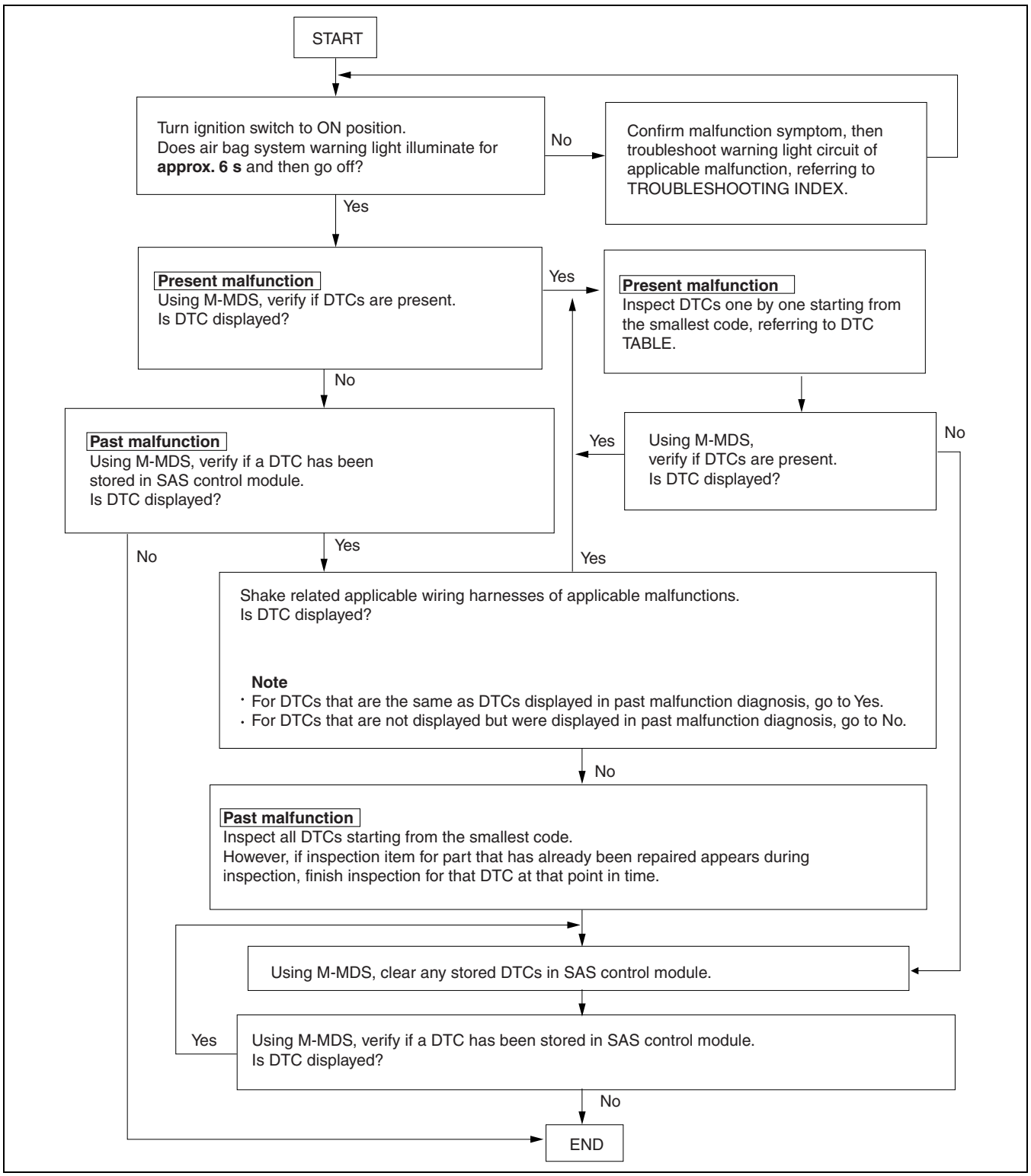
## FLOWCHART

id080200800200

- Use the following flowchart to verify the cause of the trouble.

**Note**

- While performing the inspection of the past malfunction code, the applicable DTCs may be added to memory by removing or disconnecting the related parts. Inspect only the DTCs that were indicated before inspecting.
- When DTCs of the present malfunction are no longer output after present or past malfunctions or both have been repaired, be sure to perform past malfunction display cancellation to prevent repair of malfunctions that have already been repaired.

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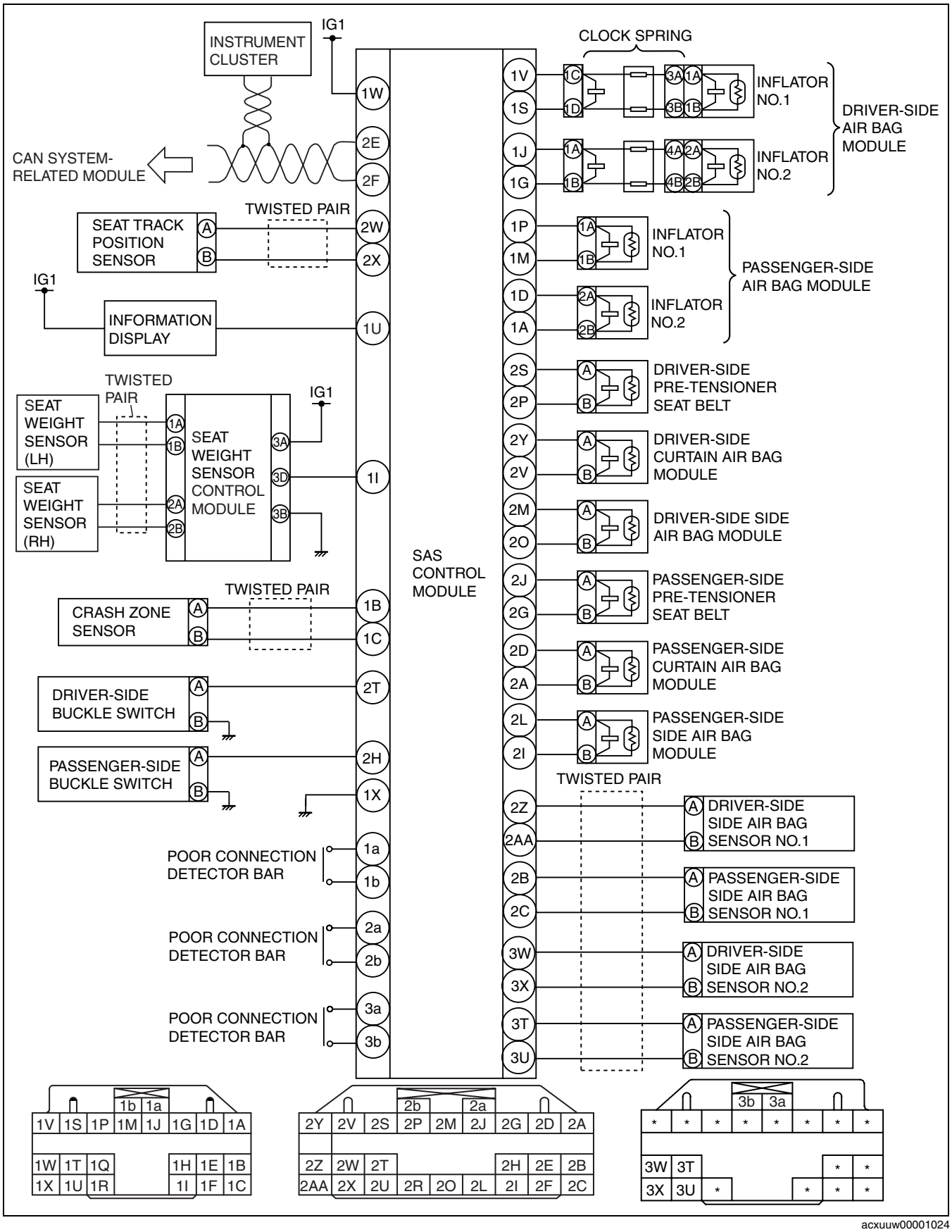
## AIR BAG SYSTEM WIRING DIAGRAM

id080200800300

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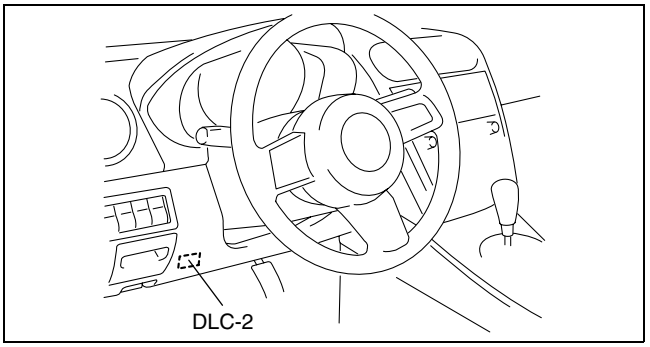
## DTC DISPLAY

id080200800400

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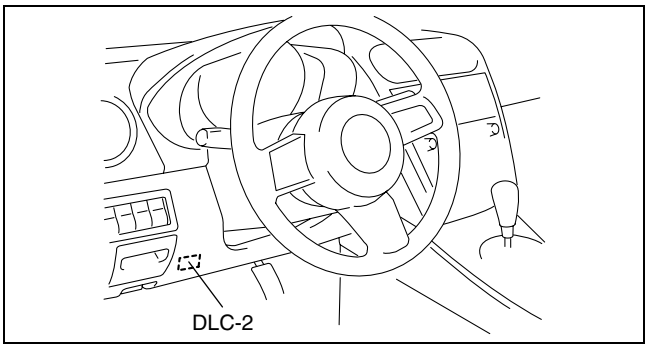
1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     - — Select the “Toolbox” tab.
     - — Select “Self Test”.
     - — Select “Module”.
     - — Select “RCM”.
   - When using the PDS (pocket PC)
     - — Select “Module Tests”.
     - — Select “RCM”.
     - — Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the SAS control module. (See 08-02-4 CLEARING DTC.)

## CLEARING DTC

id080200800500

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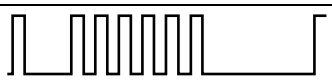
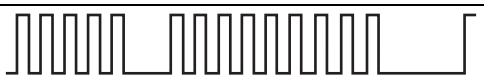
1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     - — Select the “Toolbox” tab.
     - — Select “Self Test”.
     - — Select “Module”.
     - — Select “RCM”.
   - When using the PDS (pocket PC)
     - — Select “Module Tests”.
     - — Select “RCM”.
     - — Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
4. Press the clear button on the DTC screen to clear the DTC.
5. Verify that no DTCs are displayed.

## DTC TABLE

id080200800600

- DTCs are common for present and past malfunction diagnosis.

**Note**
- When DTCs not shown in the DTC table are displayed, replace the SAS control module.
- If the air bag system warning light does not illuminate or remains illuminated when the ignition switch is turned to the ON position, inspect and repair the air bag system warning light circuit, and then confirm that the air bag system warning light is operational.
- The air bag system warning light flashes the DTC pattern for five cycles, and then remains illuminated until the ignition switch is turned to the ACC or LOCK position.

| DTC | | | | System malfunction location | Page |
|---|---|---|---|---|---|
| M-MDS display | Air bag system warning light | | | | |
| | Flashing pattern | | Priority ranking | | |
| B1013 | 16 |  | 21 | Seat weight sensor calibration error | (See 08-02-10 DTC B1013) |
| B1017 | 59 |  | 4 | Deployment prohibited because configuration is not set | (See 08-02-11 DTC B1017) |
| B1144 | 45 | | 11 | Driver-side side air bag sensor No.2 system internal circuit disabled | (See 08-02-12 DTC B1144, B1145) |
| B1145 | | | | Driver-side side air bag sensor No.2 system communication error | |

| DTC | | | | System malfunction location | Page |
|---|---|---|---|---|---|
| M-MDS display | Air bag system warning light | | | | |
| | Flashing pattern | | Priority ranking | | |
| B1146 | 46 | | 10 | Passenger-side side air bag sensor No.2 system internal circuit disabled | (See 08-02-14 DTC B1146, B1147) |
| B1147 | | | | Passenger-side side air bag sensor No.2 system communication error | |
| B1231 | 13 | | 3 | SAS control module activation (deployment) control freeze | (See 08-02-15 DTC B1231) |
| B1317 | — | Air bag system warning light is illuminated all the time | — | SAS control module power supply voltage increases (16.1 V or more) | (See 08-02-16 DTC B1317, B1318) |
| B1318 | — | Air bag system warning light is illuminated all the time | — | SAS control module power supply voltage decreases (less than 8 V) | |
| B1342 | 12 | | 2 | SAS control module (internal circuit abnormal) | (See 08-02-17 DTC B1342) |
| | — | Continuously illuminated | 1 | SAS control module (DTC 12 detection circuit malfunction) | |
| B1868 | — | — | — | Air bag system warning light malfunction | (See 08-02-18 DTC B1868) |
| B1877 | 38 | | 16 | Driver-side pre-tensioner seat belt circuit resistance high | (See 08-02-18 DTC B1877, B1878, B1879, B1885) |
| B1878 | | | | Driver-side pre-tensioner seat belt circuit short to power supply | |
| B1879 | | | | Driver-side pre-tensioner seat belt circuit short to body ground | |
| B1881 | 39 | | 15 | Passenger-side pre-tensioner seat belt circuit resistance high | (See 08-02-20 DTC B1881, B1882, B1883, B1886) |
| B1882 | | | | Passenger-side pre-tensioner seat belt circuit short to power supply | |
| B1883 | | | | Passenger-side pre-tensioner seat belt circuit short to body ground | |
| B1884 | 18 | | 22 | Passenger air bag deactivation (PAD) indicator circuit open or short to body ground | (See 08-02-22 DTC B1884, B1890) |
| B1885 | 38 | | 16 | Driver-side pre-tensioner seat belt circuit resistance low | (See 08-02-18 DTC B1877, B1878, B1879, B1885) |
| B1886 | 39 | | 15 | Passenger-side pre-tensioner seat belt circuit resistance low | (See 08-02-20 DTC B1881, B1882, B1883, B1886) |
| B1890 | 18 | | 22 | Passenger air bag deactivation (PAD) indicator circuit short to power supply | (See 08-02-22 DTC B1884, B1890) |
| B1913 | 19 | | 14 | Driver-side air bag module (inflator No.1) circuit short to body ground | (See 08-02-24 DTC B1913, B1916, B1932, B1934) |
| | 21 | | 13 | Passenger-side air bag module (inflator No.1) circuit short to body ground | (See 08-02-27 DTC B1913, B1925, B1933, B1935) |

| DTC | | | | System malfunction location | Page |
|---|---|---|---|---|---|
| M-MDS display | Air bag system warning light | | | | |
| | Flashing pattern | | Priority ranking | | |
| B1916 | 19 | | 14 | Driver-side air bag module (inflator No.1) circuit short to power supply | (See 08-02-24 DTC B1913, B1916, B1932, B1934) |
| B1925 | 21 | | 13 | Passenger-side air bag module (inflator No.1) circuit short to power supply | (See 08-02-27 DTC B1913, B1925, B1933, B1935) |
| B1932 | 19 | | 14 | Driver-side air bag module (inflator No.1) circuit resistance high | (See 08-02-24 DTC B1913, B1916, B1932, B1934) |
| B1933 | 21 | | 13 | Passenger-side air bag module (inflator No.1) circuit resistance high | (See 08-02-27 DTC B1913, B1925, B1933, B1935) |
| B1934 | 19 | | 14 | Driver-side air bag module (inflator No.1) circuit resistance low | (See 08-02-24 DTC B1913, B1916, B1932, B1934) |
| B1935 | 21 | | 13 | Passenger-side air bag module (inflator No.1) circuit resistance low | (See 08-02-27 DTC B1913, B1925, B1933, B1935) |
| B1992 | 22 | | 18 | Driver-side side air bag module circuit short to power supply | (See 08-02-29 DTC B1992, B1993, B1994, B1995) |
| B1993 | | | | Driver-side side air bag module circuit short to body ground | |
| B1994 | | | | Driver-side side air bag module circuit resistance high | |
| B1995 | | | | Driver-side side air bag module circuit resistance low | |
| B1996 | 23 | | 17 | Passenger-side side air bag module circuit short to power supply | (See 08-02-30 DTC B1996, B1997, B1998, B1999) |
| B1997 | | | | Passenger-side side air bag module circuit short to body ground | |
| B1998 | | | | Passenger-side side air bag module circuit resistance high | |
| B1999 | | | | Passenger-side side air bag module circuit resistance low | |
| B2228 | 19 | | 14 | Driver-side air bag module (inflator No.2) circuit short to body ground | (See 08-02-32 DTC B2228, B2230, B2232, B2234) |
| B2229 | 21 | | 13 | Passenger-side air bag module (inflator No.2) circuit short to body ground | (See 08-02-35 DTC B2229, B2231, B2233, B2235) |
| B2230 | 19 | | 14 | Driver-side air bag module (inflator No.2) circuit short to power supply | (See 08-02-32 DTC B2228, B2230, B2232, B2234) |
| B2231 | 21 | | 13 | Passenger-side air bag module (inflator No.2) circuit short to power supply | (See 08-02-35 DTC B2229, B2231, B2233, B2235) |

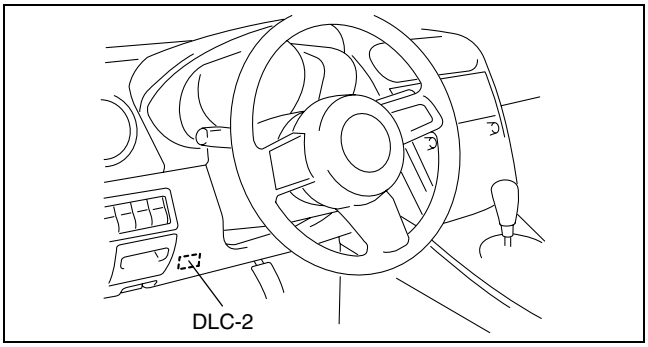
| DTC | | | | System malfunction location | Page |
|---|---|---|---|---|---|
| M-MDS display | Air bag system warning light | | | | |
| | Flashing pattern | | Priority ranking | | |
| B2232 | 19 | | 14 | Driver-side air bag module (inflator No.2) circuit resistance high | (See 08-02-32 DTC B2228, B2230, B2232, B2234) |
| B2233 | 21 | | 13 | Passenger-side air bag module (inflator No.2) circuit resistance high | (See 08-02-35 DTC B2229, B2231, B2233, B2235) |
| B2234 | 19 | | 14 | Driver-side air bag module (inflator No.2) circuit resistance low | (See 08-02-32 DTC B2228, B2230, B2232, B2234) |
| B2235 | 21 | | 13 | Passenger-side air bag module (inflator No.2) circuit resistance low | (See 08-02-35 DTC B2229, B2231, B2233, B2235) |
| B2290 | 16 | | 21 | Seat weight sensor signal malfunction | (See 08-02-37 DTC B2290) |
| B2296 | 42 | | 9 | Crash zone sensor (communication error, internal circuit abnormal) | (See 08-02-38 DTC B2296) |
| B2444 | 43 | | 8 | Driver-side side air bag sensor (internal circuit abnormal) | (See 08-02-40 DTC B2444, U2017) |
| B2445 | 44 | | 7 | Passenger-side side air bag sensor (internal circuit abnormal) | (See 08-02-43 DTC B2445, U2018) |
| B2477 | 54 | | 5 | Configuration error | (See 08-02-45 DTC B2477) |
| B2773 | 24 | | 20 | Driver-side curtain air bag module circuit resistance low | (See 08-02-45 DTC B2773, B2774, B2775, B2776) |
| B2774 | | | | Driver-side curtain air bag module circuit resistance high | |
| B2775 | | | | Driver-side curtain air bag module circuit short to body ground | |
| B2776 | | | | Driver-side curtain air bag module circuit short to power supply | |
| B2777 | 25 | | 19 | Passenger-side curtain air bag module circuit resistance low | (See 08-02-47 DTC B2777, B2778, B2779, B2780) |
| B2778 | | | | Passenger-side curtain air bag module circuit resistance high | |
| B2779 | | | | Passenger-side curtain air bag module circuit short to body ground | |
| B2780 | | | | Passenger-side curtain air bag module circuit short to power supply | |
| B2867 | 58 | | 6 | Poor connection of any SAS control module connectors | (See 08-02-49 DTC B2867) |
| C1947 | 49 | | 23 | Seat track position sensor circuit short to body ground | (See 08-02-50 DTC C1947, C1948, C1981) |
| C1948 | | | | Seat track position sensor circuit resistance not within specification | |
| C1981 | | | | Seat track position sensor circuit open or short to power supply | |

| DTC | | | | System malfunction location | Page |
|---|---|---|---|---|---|
| M-MDS display | Air bag system warning light | | | | |
| | Flashing pattern | | Priority ranking | | |
| U2017 | 43 | | 8 | Driver-side side air bag sensor (communication error) | (See 08-02-40 DTC B2444, U2017) |
| U2018 | 44 | | 7 | Passenger-side side air bag sensor (communication error) | (See 08-02-43 DTC B2445, U2018) |
| U0073 | 14 | | 12 | CAN system communication error | (See 09-02D-7 DTC TABLE[MULTIPLE X COMMUNICATION SYSTEM]) |
| U0151 | | | | Communication error to SAS control module | |
| U0155 | | | | Communication error to instrument cluster | |

### PID/DATA MONITOR DISPLAY

id080200800700

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     - — Select the “Toolbox” tab.
     - — Select “DataLogger”.
     - — Select “Module”.
     - — Select “RCM”.
   - When using the PDS (pocket PC)
     - — Select “Module Tests”.
     - — Select “RCM”.
     - — Select “DataLogger”.
3. Select the applicable PID from the PID table.
4. Verify the PID data according to the directions on the screen.

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**Note**

- The PID data screen function is used for monitoring the calculated value. Therefore, if the monitored value of the output parts is not within the specification, inspection of the monitored value of input parts corresponding to applicable output part control is necessary. In addition, because the system does not display output part malfunction as abnormality in the monitored value, it is necessary to inspect the output part individually.

### PID/DATA MONITOR TABLE

id080200800800

| PID name (definition) | Unit/Condition | Operation Condition (Reference) | Terminal |
|---|---|---|---|
| BUCKLE_D (Driver-side buckle switch status) | Buckled/ Unbuckled | • Driver-side buckle switch off: Buckled<br>• Driver-side buckle switch on: Unbuckled | 2T |
| BUCKLE_P (Passenger-side buckle switch status) | Buckled/ Unbuckled | • Passenger-side buckle switch off: Buckled<br>• Passenger-side buckle switch on: Unbuckled | 2H |
| CCNT_RCM (Number of continuous DTCs) | — | Indicates number of DTC | — |
| DTC_CLR_ST*1 (Seat weight sensor status) | Starting/ Normal End/ End In Process/ OCS Fault | Fault information cleared at seat weight sensor | 1I |
| IGN_V_2 (IG1 voltage) | V | Ignition switch is at ON: B+ | 1W |

| PID name (definition) | Unit/Condition | Operation Condition (Reference) | Terminal |
|---|---|---|---|
| OCS_CAL_ST*2<br>(Seat weight sensor calibration status) | Starting/<br>Normal End/<br>Commanding/<br>NG (Voltage)/<br>NG (Weight)/<br>Timeout/<br>In Process/<br>OCS Fault | • Seat weight sensor calibration start-up: Starting<br>• Seat weight sensor calibration completed normally: Normal End<br>• Seat weight sensor calibration command being sent: Commanding<br>• Voltage malfunction during seat weight sensor calibration: NG (Voltage)<br>• Weight error during seat weight sensor calibration: NG (Weight)<br>• Seat weight sensor calibration time limit passed: Timeout<br>• Seat weight sensor calibration being processed: In Process<br>• Seat weight sensor or Seat weight sensor control module malfunction: OCS Fault | 1I |
| OCS_SYS_ST*1<br>(Seat weight sensor status) | Empty/<br>SMALL/<br>Indeterminate/<br>LARGE/<br>Invalid | Occupant classification status determined by seat weight sensor | 1I |
| OCSFLT_CAL<br>(Passenger sensing system calibration status) | OK/<br>FAULT | • Sensor normal: OK<br>• Seat weight sensor calibration error: FAULT | 1I |
| OCSFLT_COM<br>(Passenger sensing system communication status) | OK/<br>FAULT | • Sensor normal: OK<br>• Seat weight sensor control module communication error: FAULT | 1I |
| OCSFLT_L<br>(Passenger sensing system (LH) malfunction status) | OK/<br>FAULT | • Sensor normal: OK<br>• Seat weight sensor (LH) malfunction: FAULT | 1I |
| OCSFLT_MDL<br>(Passenger sensing system control module malfunction status) | OK/<br>FAULT | • Sensor normal: OK<br>• Seat weight sensor control module malfunction: FAULT | 1I |
| OCSFLT_R<br>(Passenger sensing system (RH) malfunction status) | OK/<br>FAULT | • Sensor normal: OK<br>• Seat weight sensor (RH) malfunction: FAULT | 1I |
| PS_WEIGHT<br>(Seat weight sensor measured weight of passenger) | kg | Display of load (body weight) on passenger-side seat | 1I |
| PSAB_DepSt<br>(Passenger-side air bag module deployment status) | Inactive/<br>Active | • Passenger-side air bag module non-operation (non-deployment) status: Inactive<br>• Passenger-side air bag module operation (deployment) enabled status: Active | 1I |
| RES_AB_D<br>(Driver-side air bag module (inflator No.1) resistance) | ohm | Under any condition: 1.5— 4.4 ohms | 1S, 1V |
| RES_AB_P<br>(Passenger-side air bag module (inflator No.1) resistance) | ohm | Under any condition: 1.4— 3.6 ohms | 1M, 1P |
| RES_AB2_D<br>(Driver-side air bag module (inflator No.2) resistance) | ohm | Under any condition: 1.5— 4.4 ohms | 1G, 1J |
| RES_AB2_P<br>(Passenger-side air bag module (inflator No.2) resistance) | ohm | Under any condition: 1.4— 3.6 ohms | 1A, 1D |
| RES_CAB_D<br>(Driver-side curtain air bag module resistance) | ohm | Under any condition: 1.4— 3.9 ohms | 2V, 2Y |
| RES_CAB_P<br>(Passenger-side curtain air bag module resistance) | ohm | Under any condition: 1.4— 3.9 ohms | 2A, 2D |
| RES_PT_D<br>(Driver-side pre-tensioner seat belt resistance) | ohm | Under any condition: 1.5— 3.7 ohms | 2P, 2S |

| PID name (definition) | Unit/Condition | Operation Condition (Reference) | Terminal |
|---|---|---|---|
| RES_PT_P<br>(Passenger-side pre-tensioner seat belt resistance) | ohm | Under any condition: 1.5— 3.7 ohms | 2G, 2J |
| RES_SAB_D<br>(Driver-side side air bag module resistance) | ohm | Under any condition: 1.4— 3.9 ohms | 2M, 2O |
| RES_SAB_P<br>(Passenger-side side air bag module resistance) | ohm | Under any condition: 1.4— 3.9 ohms | 2I, 2L |
| TRAK_SW<br>(Seat track position sensor state) | Forward/<br>Rearward | • Front seat front position: Forward<br>• Front seat rear position: Rearward | 2W, 2X |

*1 : Used during seat weight sensor calibration setting. Not necessary for diagnostic.

*2 : When the calibration error is displayed, the error can be cleared by turning the ignition switch to the LOCK position.

### DTC B1013

id080200800900

| DTC B1013 | Seat weight sensor calibration error |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• Calibration set value not within valid range. |
| POSSIBLE CAUSE | • Weight acting on passenger-side seat during calibration<br>• Improperly installed passenger-side seat part at time of calibration<br>• Deformed floor where attached to passenger-side seat<br>• Deformed passenger-side seat under-bracket or frame<br>• Seat weight sensor deformed or malfunction<br>• Seat weight sensor control module malfunction<br>• SAS control module malfunction<br>• Load to or deformation of the seat belt rail |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT SEAT WEIGHT SENSOR**<br>• Properly install the passenger-side front seat.<br>• Inspect the seat weight sensor. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)<br>• Is the seat weight sensor normal? | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | **INSPECT PASSENGER-SIDE FRONT SEAT**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the passenger-side seat and visually inspect for the following:<br>— Seat under-bracket deformation<br>— Seat frame deformation<br>— Seat weight sensor deformation<br>— Foreign objects stuck in seat<br>• Are any of the parts deformed or are any foreign objects stuck in the seat? | Yes | Replace any deformed parts or remove any foreign objects.<br>• After replacement, perform seat weight sensor calibration and reperform the DTC inspection. If the DTC is displayed, go the next step. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT FLOOR**<br>• Visually inspect the installation parts of the passenger-side seat for the following:<br>— Abnormal floor deformation<br>— Installation hole of passenger-side seat is improperly positioned<br>• Is the floor normal? | Yes | Go to the next step. |
| | | No | Repair floor deformation.<br>• After repair, perform seat weight sensor calibration and reperform the DTC inspection. If the DTC is displayed even though the floor has been repaired, go the next step. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.) |
| 4 | **INSPECT SEAT WEIGHT SENSOR CONTROL MODULE**<br>• Replace the seat weight sensor.<br>• After replacement, perform seat weight sensor calibration. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)<br>• Reperform the DTC inspection.<br>• Is DTC B1013 indicated? | Yes | Replace the seat weight sensor control module. (See 08-10-11 SEAT WEIGHT SENSOR CONTROL MODULE REMOVAL/INSTALLATION.)<br>• After replacement, perform seat weight sensor calibration and reperform the DTC inspection. If the DTC is displayed even though the seat weight sensor control module has been replaced, replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

**DTC B1017**

id080200820000

| DTC B1017 | Deployment prohibited because configuration is not set |
|---|---|
| **DETECTION CONDITION** | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• SAS control module configuration has not been set. |
| **POSSIBLE CAUSE** | • SAS control module configuration has not been set<br>• SAS control module malfunction |

**Diagnostic procedure**

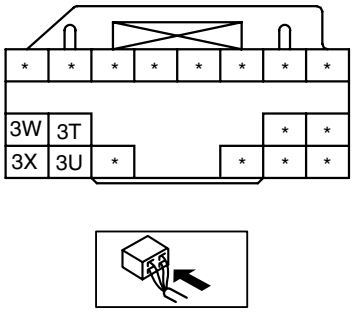
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **CONFIGURATION**<br>• Using the M-MDS perform SAS control module configuration. (See 08-10-11 SAS CONTROL MODULE CONFIGURATION.)<br>• Turn the ignition switch to the ON position.<br>• Is DTC B1017 indicated? | Yes | **[Present malfunction diagnosis]**<br>• When only DTC B1017 is displayed:<br>— Go to the next step.<br>• When DTCs except B1017 are also displayed:<br>— Perform troubleshooting according to the corresponding DTC inspection (except DTC B1017).<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | DTC troubleshooting completed. |
| 2 | **INSPECT SAS CONTROL MODULE**<br>• Using the M-MDS perform SAS control module configuration. (See 08-10-11 SAS CONTROL MODULE CONFIGURATION.)<br>• Turn the ignition switch to the ON position.<br>• Is DTC B1017 indicated? | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | DTC troubleshooting completed. |

## DTC B1144, B1145

id080200809800

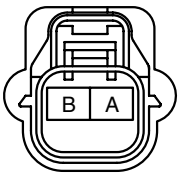
| | | |
|---|---|---|
| DTC | B1144 | **Driver-side side air bag sensor No. 2 system internal circuit disabled** |
| | B1145 | **Driver-side side air bag sensor No. 2 system communication error** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Malfunction in wiring harness between driver-side side air bag sensor No. 2 and SAS control module<br>• Malfunction in driver-side side air bag sensor No. 2 circuit |
| **POSSIBLE CAUSE** | | • Open or short circuit in wiring harness between driver-side side air bag sensor No. 2 and SAS control module<br>• Driver-side side air bag sensor No. 2 malfunction (Including incorrect assembly)<br>• SAS control module malfunction |

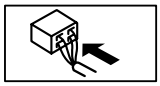
SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR






DRIVER-SIDE SIDE AIR BAG SENSOR NO. 2 WIRING HARNESS-SIDE CONNECTOR



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE SIDE AIR BAG SENSOR NO. 2 CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the trunk side trim (driver-side). (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver-side side air bag sensor No. 2 connector.<br>• Is there any malfunction of the driver-side side air bag sensor No. 2 connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |

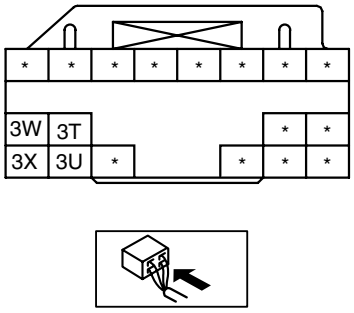
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG SENSOR NO. 2 AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Disconnect the driver and passenger-side front seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/ INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/ INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Disconnect the driver-side side air bag sensor No. 2 connector.<br>• Connect the negative battery cable.<br>• Inspect the wiring harnesses between SAS control module terminal 3X and driver-side side air bag sensor No. 2 terminal A, SAS control module terminal 3W and driver-side side air bag sensor No. 2 terminal B for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Replace the driver-side side air bag sensor No. 2, then go to the next step. (See 08-10-14 SIDE AIR BAG SENSOR NO. 2 REMOVAL/INSTALLATION.) |
| | | No | Replace the air bag wiring harness. |
| 3 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the SAS control module connector.<br>• Connect the driver-side side air bag sensor No. 2 connector.<br>• Are DTCs B1144, B1145 indicated? | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | DTC troubleshooting completed. |

**DTC B1146, B1147**

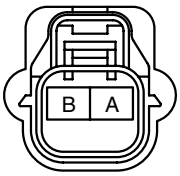
id080200809900

| | | |
|---|---|---|
| **DTC** | **B1146** | **Passenger-side side air bag sensor No. 2 system internal circuit disabled** |
| | **B1147** | **Passenger-side side air bag sensor No. 2 system communication error** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Malfunction in wiring harness between passenger-side side air bag sensor No. 2 and SAS control module<br>• Malfunction in passenger-side side air bag sensor No. 2 circuit |
| **POSSIBLE CAUSE** | | • Open or short circuit in wiring harness between passenger-side side air bag sensor No. 2 and SAS control module<br>• Passenger-side side air bag sensor No. 2 malfunction (Including incorrect assembly)<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




PASSENGER-SIDE SIDE AIR BAG SENSOR NO. 2 WIRING HARNESS-SIDE CONNECTOR




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PASSENGER-SIDE SIDE AIR BAG SENSOR NO. 2 CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the trunk side trim (passenger-side). (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the passenger-side side air bag sensor No. 2 connector.<br>• Is there any malfunction of the passenger-side side air bag sensor No. 2 connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE SIDE AIR BAG SENSOR NO. 2 AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Disconnect the driver and passenger-side front seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/ INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/ INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Disconnect the passenger-side side air bag sensor No. 2 connector.<br>• Connect the negative battery cable.<br>• Inspect the wiring harnesses between SAS control module terminal 3U and passenger-side side air bag sensor No. 2 terminal A, SAS control module terminal 3T and passenger-side side air bag sensor No. 2 terminal B for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Replace the passenger-side side air bag sensor No. 2, then go to the next step. (See 08-10-14 SIDE AIR BAG SENSOR NO. 2 REMOVAL/INSTALLATION.) |
| | | No | Replace the air bag wiring harness. |
| 3 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the SAS control module connector.<br>• Connect the passenger-side side air bag sensor No. 2 connector.<br>• Are DTCs B1146, B1147 indicated. | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | DTC troubleshooting completed. |

**DTC B1231**

id080200801000

| DTC B1231 | SAS control module activation (deployment) control freeze |
|---|---|
| **DETECTION CONDITION** | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection with only detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• SAS control module determined collision |

**Diagnostic procedure**

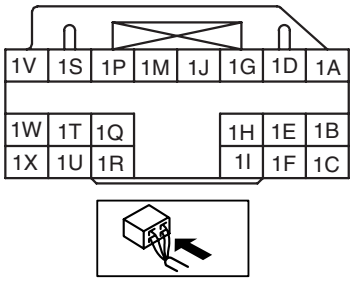
| ACTION |
|---|
| Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |

## DTC B1317, B1318

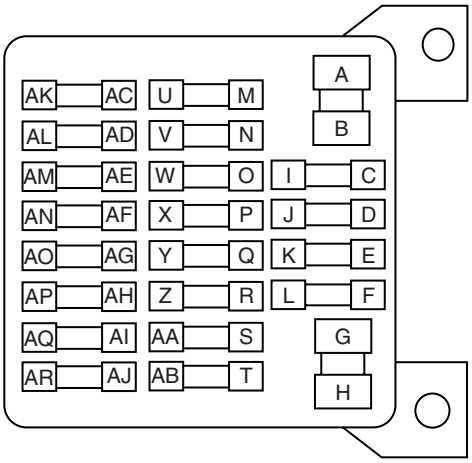
id080200811500

| | | |
|---|---|---|
| DTC | B1317 | **SAS control module power supply voltage increases (16.1 V or more)** |
| | B1318 | **SAS control module power supply voltage decreases (less than 8 V)** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• When the SAS control module power supply voltage is not **within 8—16 V**. |
| **POSSIBLE CAUSE** | | • Open or short circuit in wiring harness between battery and SAS control module<br>• ARS 7.5 A fuse malfunction<br>• Battery malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




FUSE BLOCK




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FUSE**<br>• Remove the ARS 7.5 A fuse.<br>• Is the fuse normal? | Yes | Install the fuse, then go to the next step. |
| | | No | Replace the fuse. |
| 2 | **INSPECT BATTERY**<br>• Measure the battery positive voltage.<br>• Is the voltage **8 V—16 V**? | Yes | Go to the next step. |
| | | No | Battery is malfunctioning<br>Inspect the charge/discharge system. |
| 3 | **INSPECT WIRING HARNESS BETWEEN BATTERY AND FUSE BLOCK**<br>• Turn the ignition switch to the ON position.<br>• Measure the fuse block terminal Y voltage.<br>• Is the voltage **8 V—16 V**? | Yes | Install the fuse, then go to the next step. |
| | | No | Repair the wiring harness between the battery and fuse block. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT WIRING HARNESS BETWEEN FUSE BLOCK AND SAS CONTROL MODULE**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner front buckles, which may seriously injure you. Read the service warnings before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar lower trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar lower trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Turn the ignition switch to the ON position.<br>• Is the voltage **8 V—16 V**? | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | Replace the wiring harness between the fuse block and SAS control module. |



**DTC B1342**

id080200801100

| DTC B1342 | SAS control module (internal circuit abnormal) |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• Malfunction in the SAS control module internal circuit |
| POSSIBLE CAUSE | SAS control module malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT SAS CONTROL MODULE**<br>• Using the M-MDS, perform SAS control module configuration.<br>• Is DTC B1342 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

### DTC B1868

id080200815000

| DTC B1868 | Air bag warning system light malfunction |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection with only detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Air bag warning system light malfunction. |

**Diagnostic procedure**

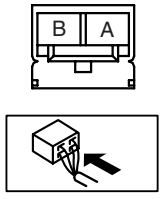
| ACTION |
|---|
| **INSPECT INSTRUMENT CLUSTER**<br>Peform the “INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE”.<br>(See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) |

### DTC B1877, B1878, B1879, B1885

id080200801400

| DTC | | |
|---|---|---|
| | B1877 | Driver-side pre-tensioner seat belt circuit resistance high |
| | B1878 | Driver-side pre-tensioner seat belt circuit short to power supply |
| | B1879 | Driver-side pre-tensioner seat belt circuit short to body ground |
| | B1885 | Driver-side pre-tensioner seat belt circuit resistance low |
| DETECTION CONDITION | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.5— 3.7 ohms**) detected in the driver-side pre-tensioner seat belt circuit<br>• Malfunction in the wiring harness between the driver-side pre-tensioner seat belt and SAS control module |
| POSSIBLE CAUSE | | • Open or short circuit in the wiring harness between the driver-side pre-tensioner seat belt and SAS control module<br>• Driver-side pre-tensioner seat belt malfunction<br>• SAS control module malfunction |

DRIVER-SIDE PRE-TENSIONER SEAT BELT
WIRING HARNESS-SIDE CONNECTOR




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_PT_D<br>• Is driver-side pre-tensioner seat belt resistance normal?<br>— Resistance: **1.5—3.7 ohms** | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |

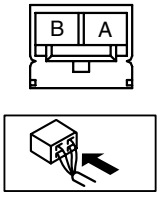
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver-side pre-tensioner seat belt connector.<br>• Is there any malfunction of the driver-side pre-tensioner seat belt connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE PRE-TENSIONER SEAT BELT OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to driver-side pre-tensioner seat belt connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1877, B1878, B1879 and/or B1885 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the driver-side pre-tensioner seat belt. (See 08-11-2 FRONT SEAT BELT REMOVAL/ INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the driver-side pre-tensioner seat belt connector.<br>• Are DTCs B1877, B1878, B1879 and/or B1885 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1881, B1882, B1883, B1886

id080200801500

| | | |
|---|---|---|
| DTC | B1881 | **Passenger-side pre-tensioner seat belt circuit resistance high** |
| | B1882 | **Passenger-side pre-tensioner seat belt circuit short to power supply** |
| | B1883 | **Passenger-side pre-tensioner seat belt circuit short to body ground** |
| | B1886 | **Passenger-side pre-tensioner seat belt circuit resistance low** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.5— 3.7 ohms**) detected in the passenger-side pre-tensioner circuit<br>• Malfunction in the wiring harness between the passenger-side pre-tensioner seat belt and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the passenger-side pre-tensioner seat belt and SAS control module<br>• Passenger-side pre-tensioner seat belt malfunction<br>• SAS control module malfunction |

PASSENGER-SIDE PRE-TENSIONER SEAT BELT
WIRING HARNESS-SIDE CONNECTOR




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT**<br>• Using the M-MDS, verify the following PID/DATA monitor. (See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_PT_P<br>• Is passenger-side pre-tensioner resistance normal?<br>— Resistance: **1.5—3.7 ohms** | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |

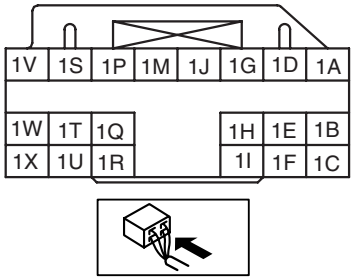
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT DRIVER-SIDE PRE-TENSIONER SEAT BELT CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side pre-tensioner connector.<br>• Is there any malfunction of the passenger-side pre-tensioner connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE PRE-TENSIONER SEAT BELT OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to passenger-side pre-tensioner connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1881, B1882, B1883 and/or B1886 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the passenger-side pre-tensioner. (See 08-11-2 FRONT SEAT BELT REMOVAL/ INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the passenger-side pre-tensioner connector.<br>• Are DTCs B1881, B1882, B1883 and/or B1886 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1884, B1890

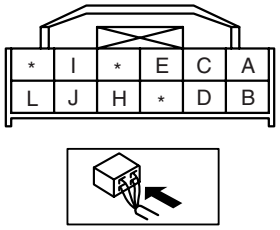
id080200801600

| | | |
|---|---|---|
| **DTC** | **B1884** | **Passenger air bag deactivation (PAD) indicator circuit open or short to body ground** |
| | **B1890** | **Passenger air bag deactivation (PAD) indicator circuit short to power supply** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Malfunction in PAD indicator circuit |
| **POSSIBLE CAUSE** | | • Open or short circuit in wiring harness between information display and SAS control module<br>• Open circuit in wiring harness between battery and information display<br>• information display malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




INFORMATION DISPLAY HARNESS-SIDE CONNECTOR




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT OPERATION OF PAD INDICATOR**<br>• Turn the ignition switch to the ON position.<br>• Does the PAD indicator illuminate? | Yes | Go to the next step. |
| | | No | Go to Step 5. |
| 2 | **INSPECT FUSE**<br>• Remove the MATER 10 A fuse.<br>• Is the fuse normal? | Yes | Install the fuse, then go to the next step. |
| | | No | Replace the fuse. |
| 3 | **INSPECT BATTERY**<br>• Measure the battery positive voltage.<br>• Is the voltage **9 V—16 V**? | Yes | Go to the next step. |
| | | No | Battery is malfunctioning<br>Inspect the charge/discharge system. |
| 4 | **INSPECT WIRING HARNESS BETWEEN BATTERY AND PAD INDICATOR**<br>• Turn the ignition switch to the ON position.<br>• Measure the information display connector terminal E voltage.<br>• Is the voltage **9 V or more**? | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the battery and information display. |

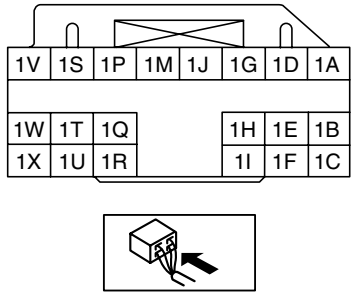
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT WIRING HARNESS BETWEEN PAD INDICATOR AND SAS CONTROL MODULE**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner front buckles, which may seriously injure you. Read the service warnings before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more.**<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Inspect the wiring harness between information display connector terminal I and SAS control module connector terminal 1U for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Go to the next step. |
| | | No | Replace the air bag wiring harness. |
| 6 | **INSPECT PAD INDICATOR**<br>• Disconnect the SAS control module connector.<br>• Connect the information display connector.<br>• Does the PAD indicator illuminate? | Yes | Replace the information display. (See 09-22-15 INFORMATION DISPLAY REMOVAL/ INSTALLATION.) |
| | | No | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |

**DTC B1913, B1916, B1932, B1934**

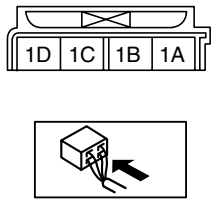
id080200801700

| | | |
|---|---|---|
| **DTC** | **B1913** | **Driver-side air bag module (inflator No.1) circuit short to body ground (air bag system warning light DTC 19 is displayed.)** |
| | **B1916** | **Driver-side air bag module (inflator No.1) circuit short to power supply** |
| | **B1932** | **Driver-side air bag module (inflator No.1) circuit resistance high** |
| | **B1934** | **Driver-side air bag module (inflator No.1) circuit resistance low** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.4— 3.9 ohms**) detected in the driver-side air bag module (inflator No.1) circuit<br>• Malfunction in the wiring harness between the driver-side air bag module (inflator No.1) and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the clock spring and SAS control module<br>• Clock spring malfunction<br>• Driver-side air bag module (inflator No.1) malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR

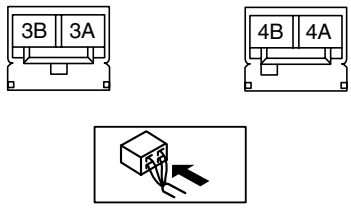



CLOCK SPRING WIRING HARNESS-SIDE CONNECTOR




DRIVER-SIDE AIR BAG MODULE WIRING HARNESS-SIDE CONNECTOR (CLOCK SPRING )

(INFLATOR NO.1) (INFLATOR NO.2)



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE AIR BAG MODULE (INFLATOR NO.1)**<br>• Using the M-MDS, verify the following PID/DATA monitor. (See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_AB_D<br>• Is the resistance of the driver-side air bag module normal?<br>— Resistance: **1.4— 3.9 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DRIVER-SIDE AIR BAG MODULE CONNECTOR (CLOCK SPRING)**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)<br>• Is there any malfunction of the driver-side air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE AIR BAG MODULE (INFLATOR NO.1) OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to driver-side air bag module (inflator No.1) connector terminals 3A and 3B, and driver-side air bag module (inflator No.2) connector terminals 4A and 4B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1913, B1916, B1932 and/or B1934 indicated? | Yes | Go to the next step. |
| | | No | Replace the driver-side air bag module.<br>(See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT CLOCK SPRING**<br>• Inspect the clock spring. (See 08-10-16 CLOCK SPRING INSPECTION.)<br>• Is the clock spring normal? | Yes | Go to the next step. |
| | | No | Replace the clock spring.<br>(See 08-10-15 CLOCK SPRING REMOVAL/INSTALLATION.) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT WIRING HARNESS BETWEEN CLOCK SPRING AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Inspect the wiring harness between SAS control module terminal 1S and clock spring terminal 1D, SAS control module terminal 1V and clock spring terminal 1C for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | Replace the air bag wiring harness. |

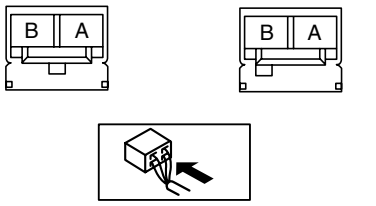
## DTC B1913, B1925, B1933, B1935

id080200801800

| | | |
|---|---|---|
| DTC | B1913 | **Passenger-side air bag module (inflator No.1) circuit short to body ground (air bag system warning light DTC 21 is displayed.)** |
| | B1925 | **Passenger-side air bag module (inflator No.1) circuit short to power supply** |
| | B1933 | **Passenger-side air bag module (inflator No.1) circuit resistance high** |
| | B1935 | **Passenger-side air bag module (inflator No.1) circuit resistance low** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.4— 3.6 ohms**) detected in the passenger-side air bag module (inflator No.1) circuit<br>• Malfunction in the wiring harness between the passenger-side air bag module (inflator No.1) and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the passenger-side air bag module (inflator No.1) and SAS control module<br>• Passenger-side air bag module (inflator No.1) malfunction<br>• SAS control module malfunction |

PASSENGER-SIDE AIR BAG MODULE
WIRING HARNESS-SIDE CONNECTOR

(INFLATOR NO.1) (INFLATOR NO.2)






08-02

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PASSENGER-SIDE AIR BAG MODULE (INFLATOR NO.1)**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_AB_P<br>• Is the resistance of the passenger-side air bag module normal?<br>— Resistance: **1.4— 3.6 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |

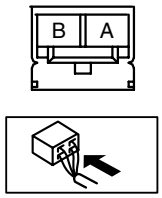
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT PASSENGER-SIDE AIR BAG MODULE (INFLATOR NO.1) CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Is there any malfunction of the passenger-side air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN PASSENGER-SIDE AIR BAG MODULE (INFLATOR NO.1) OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to passenger-side air bag module (inflator No.1) connector terminals A and B, and passenger-side air bag module (inflator No.2) connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1913, B1925, B1933 and/or B1935 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the passenger-side air bag module. (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the passenger-side air bag module connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1913, B1925, B1933 and/or B1935 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1992, B1993, B1994, B1995

id080200801900

| | | |
|---|---|---|
| DTC | B1992 | Driver-side side air bag module circuit short to power supply |
| | B1993 | Driver-side side air bag module circuit short to body ground |
| | B1994 | Driver-side side air bag module circuit resistance high |
| | B1995 | Driver-side side air bag module circuit resistance low |
| DETECTION CONDITION | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.4— 3.9 ohms**) detected in the driver-side side air bag module circuit<br>• Malfunction in the wiring harness between the driver-side side air bag module and SAS control module |
| POSSIBLE CAUSE | | • Open or short circuit in the wiring harness between the driver-side side air bag module and SAS control module<br>• Driver-side side air bag module malfunction<br>• SAS control module malfunction |

DRIVER-SIDE SIDE AIR BAG MODULE
WIRING HARNESS-SIDE CONNECTOR




08-02

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE SIDE AIR BAG MODULE**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_SAB_D<br>• Is the resistance of the driver-side side air bag module normal?<br>— Resistance: **1.4— 3.9 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DRIVER-SIDE SIDE AIR BAG MODULE CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Disconnect the driver-side side air bag module connector.<br>• Is there any malfunction of the driver-side side air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |

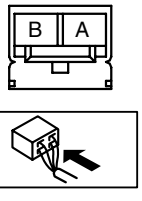
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE SIDE AIR BAG MODULE OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to driver-side side air bag module connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1992, B1993, B1994, and/or B1995 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the driver-side side air bag module. (See 08-10-8 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the driver-side side air bag module connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1992, B1993, B1994, and/or B1995 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

**DTC B1996, B1997, B1998, B1999**

id080200802000

| | | |
|---|---|---|
| **DTC** | **B1996** | **Passenger-side side air bag module circuit short to power supply** |
| | **B1997** | **Passenger-side side air bag module circuit short to body ground** |
| | **B1998** | **Passenger-side side air bag module circuit resistance high** |
| | **B1999** | **Passenger-side side air bag module circuit resistance low** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.4— 3.9 ohms**) detected in the passenger-side side air bag module circuit<br>• Malfunction in the wiring harness between the passenger-side side air bag module and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the passenger-side side air bag module and SAS control module<br>• Passenger-side side air bag module malfunction<br>• SAS control module malfunction |

PASSENGER-SIDE SIDE AIR BAG MODULE
WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

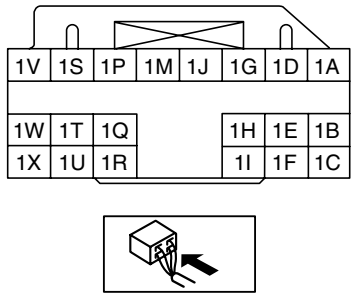
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT passenger-side side AIR BAG MODULE**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_SAB_P<br>• Is the resistance of the passenger-side side air bag module normal?<br>— Resistance: **1.4— 3.9 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DRIVER-SIDE SIDE AIR BAG MODULE CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Disconnect the passenger-side side air bag module connector.<br>• Is there any malfunction of the passenger-side side air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE SIDE AIR BAG MODULE OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to passenger-side side air bag module connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1996, B1997, B1998, and/or B1999 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the passenger-side side air bag module.<br>(See 08-10-8 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the passenger-side side air bag module connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B1996, B1997, B1998, and/or B1999 indicated? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2228, B2230, B2232, B2234

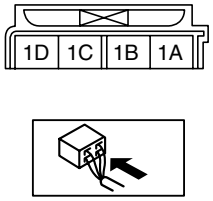
id080200802100

| | | |
|---|---|---|
| DTC | B2228 | **Driver-side air bag module (inflator No.2) circuit short to body ground** |
| | B2230 | **Driver-side air bag module (inflator No.2) circuit short to power supply** |
| | B2232 | **Driver-side air bag module (inflator No.2) circuit resistance high** |
| | B2234 | **Driver-side air bag module (inflator No.2) circuit resistance low** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.5— 4.4 ohms**) detected in the driver-side air bag module (inflator No.2) circuit<br>• Malfunction in the wiring harness between the driver-side air bag module (inflator No.2) and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the clock spring and SAS control module<br>• Clock spring malfunction<br>• Driver-side air bag module (inflator No.2) malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR

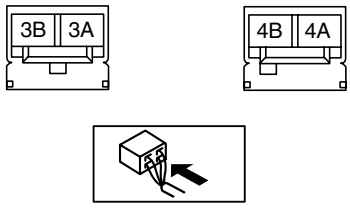



CLOCK SPRING WIRING HARNESS-SIDE CONNECTOR




DRIVER-SIDE AIR BAG MODULE WIRING HARNESS-SIDE CONNECTOR (CLOCK SPRING )

(INFLATOR NO.1) (INFLATOR NO.2)



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE AIR BAG MODULE (INFLATOR NO.1)**<br>• Using the M-MDS, verify the following PID/DATA monitor. (See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_AB2_D<br>• Is the resistance of the driver-side air bag module normal?<br>— Resistance: **1.5— 4.4 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DRIVER-SIDE AIR BAG MODULE CONNECTOR (CLOCK SPRING)**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)<br>• Is there any malfunction of the driver-side air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE AIR BAG MODULE (INFLATOR NO.1) OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to driver-side air bag module (inflator No.1) connector terminals 3A and 3B, and driver-side air bag module (inflator No.2) connector terminals 4A and 4B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2228, B2230, B2232 and/or B2234 indicated? | Yes | Go to the next step. |
| | | No | Replace the driver-side air bag module.<br>(See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT CLOCK SPRING**<br>• Inspect the clock spring. (See 08-10-16 CLOCK SPRING INSPECTION.)<br>• Is the clock spring normal? | Yes | Go to the next step. |
| | | No | Replace the clock spring.<br>(See 08-10-15 CLOCK SPRING REMOVAL/INSTALLATION.) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **INSPECT WIRING HARNESS BETWEEN CLOCK SPRING AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Inspect the wiring harness between SAS control module terminal 1G and clock spring terminal 1B, SAS control module terminal 1J and clock spring terminal 1A for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | Replace the air bag wiring harness. |

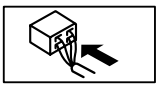
## DTC B2229, B2231, B2233, B2235

id080200802200

| | | |
|---|---|---|
| DTC | B2229 | **Passenger-side air bag module (inflator No.2) circuit short to body ground** |
| | B2231 | **Passenger-side air bag module (inflator No.2) circuit short to power supply** |
| | B2233 | **Passenger-side air bag module (inflator No.2) circuit resistance high** |
| | B2235 | **Passenger-side air bag module (inflator No.2) circuit resistance low** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.4— 3.9 ohms**) detected in the passenger-side air bag module (inflator No.2) circuit<br>• Malfunction in the wiring harness between the passenger-side air bag module (inflator No.2) and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the passenger-side air bag module (inflator No.2) and SAS control module<br>• Passenger-side air bag module (inflator No.2) malfunction<br>• SAS control module malfunction |

PASSENGER-SIDE AIR BAG MODULE
WIRING HARNESS-SIDE CONNECTOR

(INFLATOR NO.1) (INFLATOR NO.2)



**Diagnostic procedure**

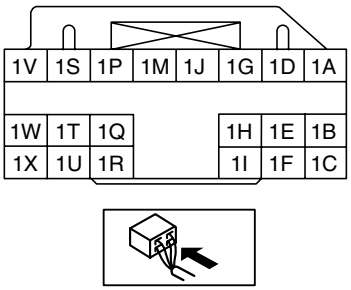
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PASSENGER-SIDE AIR BAG MODULE (INFLATOR NO.1)**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_AB2_P<br>• Is the resistance of the passenger-side air bag module normal?<br>— Resistance: **1.4— 3.9 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT PASSENGER-SIDE AIR BAG MODULE (INFLATOR NO.1) CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the glove compartment.<br>(See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Is there any malfunction of the passenger-side air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN PASSENGER-SIDE AIR BAG MODULE (INFLATOR NO.1) OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to passenger-side air bag module (inflator No.1) connector terminals A and B, and passenger-side air bag module (inflator No.2) connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2229, B2231, B2233 and/or B2235 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the passenger-side air bag module.<br>(See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the passenger-side air bag module connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2229, B2231, B2233 and/or B2235 indicated? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2290

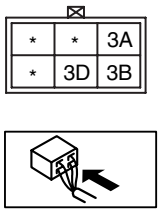
id080200802300

| DTC B2290 | Passenger sensing system malfunction |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• Passenger sensing system circuit malfunction |
| POSSIBLE CAUSE | • Seat weight sensor calibration not properly set<br>• Communication error between SAS control module and seat weight sensor control module<br>• Seat weight sensor control module internal malfunction<br>• LH or RH seat weight sensor malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




SEAT WEIGHT SENSOR CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT SEAT WEIGHT SENSOR CONTROL MODULE CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally operate (deploy) the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Disconnect the seat weight sensor control module connector.<br>• Is there any malfunction of the seat weight sensor control module connector? | Yes | Repair or replace the wiring harness.<br>After replacement, reperform the DTC inspection and verify that no DTCs are displayed. |
| | | No | Go to the next step. |
| 2 | **INSPECTION WIRING HARNESS**<br>• Disconnect the SAS control module connector.<br>• Verify continuity in the following wiring harnesses:<br>— Between SAS control module terminal 1I and seat weight sensor control module terminal 3D<br>— Between the battery and seat weight sensor control module terminal 3A<br>— Between seat weight sensor control module terminal 3B and body ground<br>• Is the continuity normal? | Yes | Go to the next step. |
| | | No | If there is any malfunction in the wiring harnesses, repair or replace the applicable wiring harness.<br>After replacement, reperform the DTC inspection and verify that no DTCs are displayed. |

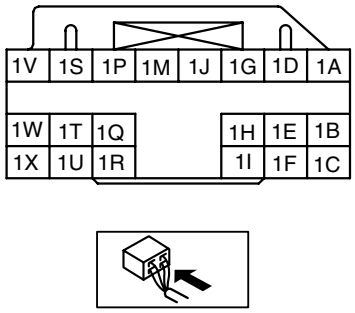
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT PASSENGER SENSING SYSTEM**<br>• Connect the seat weight sensor control module connector.<br>• Connect the SAS control module.<br>• Connect the negative battery cable.<br>• Verify the following PIDs using the M-MDS. (See 08-02-8 PID/DATA MONITOR TABLE.)<br>— OCSFLT_CAL<br>— OCSFLT_COM<br>— OCSFLT_L<br>— OCSFLT_MDL<br>— OCSFLT_R<br>• Do all PIDs display “OK”? | Yes | Go to the next step. |
| | | No | Replace the following parts according to the M-MDS screen:<br>• If OCSFLT_CAL is displayed:<br>— Perform seat weight sensor calibration (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)<br>• If OCSFLT_COM or OCSFLT_MDL is displayed:<br>— Seat weight sensor control module (See 08-10-11 SEAT WEIGHT SENSOR CONTROL MODULE REMOVAL/INSTALLATION.)<br>• If OCSFLT_L is displayed:<br>— Seat weight sensor (LH) (See: 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.)<br>• If OCSFLT_R is displayed:<br>— Seat weight sensor (RH) (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Reperform the DTC inspection.<br>• Is DTC B2290 indicated? | Yes | **[Present malfunction diangnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | DTC troubleshooting completed. |

**DTC B2296**

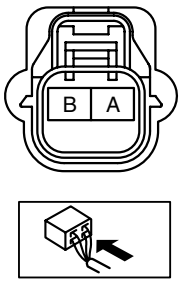
id080200802400

| DTC B2296 | Crash zone sensor (communication error, internal circuit abnormal) |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• Malfunction in the wiring harness between the crash zone sensor and SAS control module<br>• Malfunction in the crash zone sensor circuit |
| POSSIBLE CAUSE | • Open or short circuit in the wiring harness between the crash zone sensor and SAS control module<br>• SAS control module malfunction<br>• Crash zone sensor malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




CRASH ZONE SENSOR WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT CRASH ZONE SENSOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Disconnect the crash zone sensor connector.<br>• Is there any malfunction of the crash zone sensor connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 2 | **INSPECT WIRING HARNESS BETWEEN CRASH ZONE SENSOR AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Disconnect the crash zone sensor connector.<br>• Connect the negative battery cable.<br>• Inspect the wiring harnesses between SAS control module terminal 1C and crash zone sensor terminal A, SAS control module terminal 1B and crash zone sensor terminal B for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Replace the crash zone sensor, then go to the next step. (See 08-10-10 CRASH ZONE SENSOR REMOVAL/ INSTALLATION.) |
| | | No | Replace the air bag wiring harness. |

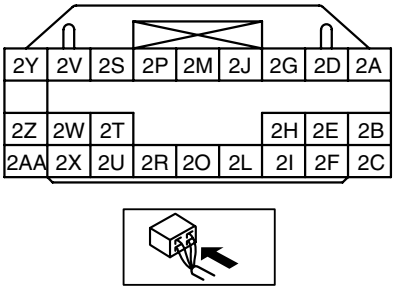
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the SAS control module connector.<br>• Connect the crash zone sensor connector.<br>• Turn the ignition switch to the ON position.<br>• Is DTC B2296 indicated? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

**DTC B2444, U2017**

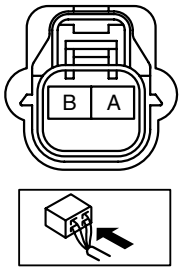
id080200802700

| DTC | | |
|---|---|---|
| | **B2444** | **Driver-side side air bag sensor No.1 (internal circuit abnormal)** |
| | **U2017** | **Driver-side side air bag sensor No.1 (communication error)** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Malfunction in the wiring harness between the driver-side side air bag sensor No.1 and SAS control module<br>• Malfunction in the driver-side side air bag sensor circuit |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the driver-side side air bag sensor No.1 and SAS control module<br>• Driver-side side air bag sensor malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




DRIVER-SIDE SIDE AIR BAG SENSOR NO.1 WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE SIDE AIR BAG SENSOR NO. 1 CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the B-pillar lower trim (driver-side). (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver-side side air bag sensor No. 1 connector.<br>• Is there any malfunction of the driver-side side air bag sensor No. 1 connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |

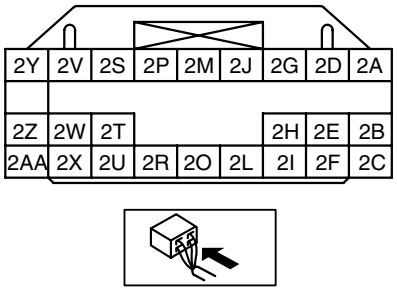
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT WIRING HARNESS BETWEEN DRIVER-SIDE SIDE AIR BAG SENSOR NO.1 AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Disconnect the driver-side side air bag sensor No.1 connector.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Connect the negative battery cable.<br>• Inspect the wiring harnesses between SAS control module connector terminal 2AA and driver-side side air bag sensor No.1 connector terminal A, SAS control module connector terminal 2Z and driver-side side air bag sensor No.1 connector terminal B for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Go to the next step. |
| | | No | Replace the air bag wiring harness. |
| 3 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the SAS control module connector.<br>• Connect the driver-side side air bag sensor No.1 connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2444 and/or U2017 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2445, U2018

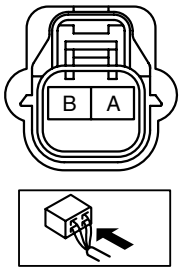
id080200802800

| | | |
|---|---|---|
| DTC | B2445 | **Passenger-side side air bag sensor No.1 (internal circuit abnormal)** |
| | U2018 | **Passenger-side side air bag sensor No.1 (communication error)** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Malfunction in the wiring harness between the passenger-side side air bag sensor and SAS control module<br>• Malfunction in the passenger-side side air bag sensor circuit |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the passenger-side side air bag sensor and SAS control module<br>• Passenger-side side air bag sensor malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




PASSENGER-SIDE SIDE AIR BAG SENSOR NO.1 WIRING HARNESS-SIDE CONNECTOR




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PASSENGER-SIDE SIDE AIR BAG SENSOR NO. 1 CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the B-pillar lower trim (passenger-side). (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the passenger-side side air bag sensor No. 1 connector.<br>• Is there any malfunction of the passenger-side side air bag sensor No. 1 connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT WIRING HARNESS BETWEEN PASSENGER-SIDE SIDE AIR BAG SENSOR NO.1 AND SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Disconnect the passenger-side side air bag sensor No.1 connector.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Connect the negative battery cable.<br>• Inspect the wiring harnesses between SAS control module connector terminal 2C and passenger-side side air bag sensor No.1 connector terminal A, SAS control module connector terminal 2B and passenger-side side air bag sensor No.1 connector terminal B for the following:<br>— Short to ground<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Go to the next step. |
| | | No | Replace the air bag wiring harness. |
| 3 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the SAS control module connector.<br>• Connect the passenger-side side air bag sensor No.1 connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2445 and/or U2018 indicated? | Yes | Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

### DTC B2477

id080200810500

| DTC B2477 | Configuration error |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• SAS control module configuration has not been performed correctly. |
| POSSIBLE CAUSE | • SAS control module configuration error<br>• SAS control module malfunction |

**Diagnostic procedure**

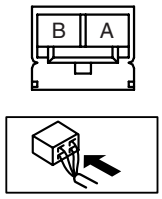
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT SAS CONTROL MODULE**<br>• Using the M-MDS, perform SAS control moduleconfiguration.<br>• Is DTC B2477 indicated? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

### DTC B2773, B2774, B2775, B2776

id080200802900

| DTC | | |
|---|---|---|
| | B2773 | **Driver-side curtain air bag module circuit resistance low** |
| | B2774 | **Driver-side curtain air bag module circuit resistance high** |
| | B2775 | **Driver-side curtain air bag module circuit short to body ground** |
| | B2776 | **Driver-side curtain air bag module circuit short to power supply** |
| DETECTION CONDITION | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Abnormal resistance (other than **1.4— 3.9 ohms**) detected in the driver-side curtain air bag module circuit<br>• Malfunction in the wiring harness between the driver-side curtain air bag module and SAS control module |
| POSSIBLE CAUSE | | • Open or short circuit in the wiring harness between the driver-side curtain air bag module and SAS control module<br>• Driver-side curtain air bag module malfunction<br>• SAS control module malfunction |

DRIVER-SIDE CURTAIN AIR BAG MODULE
WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

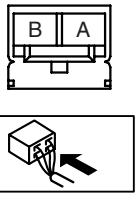
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DRIVER-SIDE CURTAIN AIR BAG MODULE**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_CAB_D<br>• Is the resistance of the driver-side curtain air bag module normal?<br>— Resistance: **1.4— 3.9 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DRIVER-SIDE CURTAIN AIR BAG MODULE CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver-side curtain air bag module connector.<br>• Is there any malfunction of the driver-side curtain air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE CURTAIN AIR BAG MODULE OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to driver-side curtain air bag module connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2773, B2774, B2775 and/or B2776 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the driver-side curtain air bag module.<br>(See 08-10-8 CURTAIN AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the driver-side curtain air bag module connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2773, B2774, B2775 and/or B2776 indicated? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2777, B2778, B2779, B2780

id080200803000

| | | |
|---|---|---|
| DTC | B2777 | **Passenger-side curtain air bag module circuit resistance low** |
| | B2778 | **Passenger-side curtain air bag module circuit resistance high** |
| | B2779 | **Passenger-side curtain air bag module circuit short to body ground** |
| | B2780 | **Passenger-side curtain air bag module circuit short to power supply** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• Abnormal resistance (other than **1.4— 3.9 ohms**) detected in the passenger-side curtain air bag module circuit<br>• Malfunction in the wiring harness between the passenger-side curtain air bag module and SAS control module |
| **POSSIBLE CAUSE** | | • Open or short circuit in the wiring harness between the passenger-side curtain air bag module and SAS control module<br>• Passenger-side curtain air bag module malfunction<br>• SAS control module malfunction |

PASSENGER-SIDE CURTAIN AIR BAG MODULE
WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

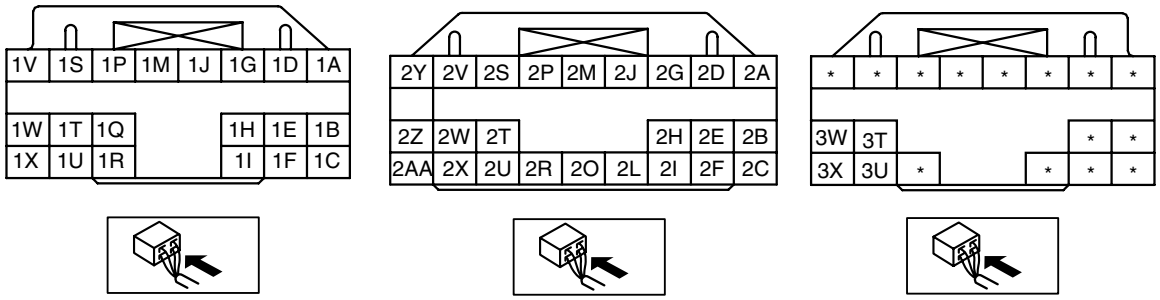
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PASSENGER-SIDE CURTAIN AIR BAG MODULE**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— RES_CAB_P<br>• Is the resistance of the passenger-side curtain air bag module normal?<br>— Resistance: **1.4— 3.9 ohms** | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 2 | **INSPECT DRIVER-SIDE CURTAIN AIR BAG MODULE CONNECTOR**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the passenger-side curtain air bag module connector.<br>• Is there any malfunction of the passenger-side curtain air bag module connector? | Yes | Replace the air bag wiring harness. |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER MALFUNCTION IS IN DRIVER-SIDE CURTAIN AIR BAG MODULE OR RELATED WIRING HARNESS**<br>• Connect the leads of the **SST (Fuel and thermometer checker)** or apply **2-ohm** resistance to passenger-side curtain air bag module connector terminals A and B.<br>• Set the resistance of the **SST (Fuel and thermometer checker)** to the **2-ohm** position.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs B2777, B2778, B2779 and/or B2780 indicated? | Yes | Replace the air bag wiring harness, then go to the next step. |
| | | No | Replace the passenger-side curtain air bag module.<br>(See 08-10-8 CURTAIN AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 4 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect the passenger-side curtain air bag module connector.<br>• Are DTCs B2777, B2778, B2779 and/or B2780 indicated? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2867

id080200803100

| DTC B2867 | Poor connection of any SAS control module connectors |
|---|---|
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• There is no continuity between the poor connection detector bar terminals of the SAS control module. |
| POSSIBLE CAUSE | • Poor connection of any SAS control module connectors<br>• Malfunction of any SAS control module connectors<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY THAT ALL SAS CONTROL MODULE CONNECTORS ARE CONNECTED WITH SAS CONTROL MODULE**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Partially peel back the floor covering.<br>• Are all SAS control module connectors securely connected? | Yes | Go to the next step. |
| | | No | Reconnect the connector properly. |

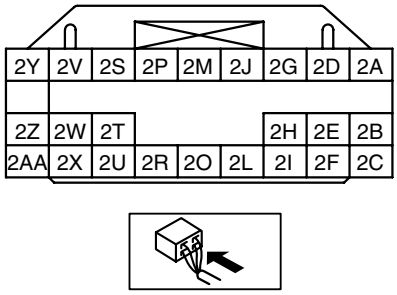
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT ALL SAS CONTROL MODULE CONNECTORS**<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Are the poor connection detector bars of SAS control module connectors normal? | Yes | Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | Replace the air bag wiring harness. |

**DTC C1947, C1948, C1981**

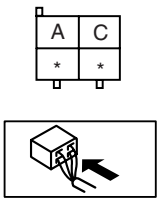
id080200803200

| | | |
|---|---|---|
| **DTC** | **C1947** | **Seat track position sensor circuit short to body ground** |
| | **C1948** | **Seat track position sensor circuit resistance not within specification** |
| | **C1981** | **Seat track position sensor circuit open or short to power supply** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only the detection conditions may cause injury due to an operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• Malfunction in seat track position sensor circuit. |
| **POSSIBLE CAUSE** | | • Malfunction of connector between seat track position sensor and SAS control module.<br>• Open or short circuit in wiring harness between seat track position sensor and SAS control module.<br>• Seat track position sensor malfunction<br>• SAS control module malfunction |

SAS CONTROL MODULE WIRING HARNESS-SIDE CONNECTOR




SEAT TRACK POSITION SENSOR WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT SEAT TRACK POSITION SENSOR CIRCUIT**<br>• Using the M-MDS, verify the following PID/DATA monitor.<br>(See 08-02-8 PID/DATA MONITOR TABLE.)<br>— TRAK_SW<br>• Is the seat track position sensor circuit normal? | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module.<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | **INSPECT WIRING HARNESS BETWEEN SEAT TRACK POSITION SENSOR AND SAS CONTROL MODULE**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the service warnings and cautions before handling the air bag system components.**<br>**(See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.)**<br>**(See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more.**<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment.(See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connector.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect the SAS control module connector.<br>• Disconnect the seat track position sensor connector<br>• Inspect the wiring harness between SAS control module terminal and seat track position sensor terminals for short to ground, short to power supply, and open circuit:<br>— 2W— C<br>— 2X— A<br>• Is the wiring harness normal? | Yes | Replace the seat track position sensor, then go to the next step. |
| | | No | Replace wiring harness, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT SAS CONTROL MODULE**<br>• Turn the ignition switch to the LOCK position.<br>• Connect the SAS control module connector.<br>• Connect the clock spring connector.<br>• Connect the passenger-side air bag module connector.<br>• Connect the driver-and passenger-side curtain air bag module connectors.<br>• Connect the driver-and passenger-side side air bag module connectors.<br>• Connect the driver-and passenger-side pre tensioner seat belt connectors.<br>• Connect the seat track position sensor connector.<br>• Turn the ignition switch to the ON position.<br>• Are DTCs C1947, C1948 and/or C1981 indicated? | Yes | **[Present malfunction diagnosis]**<br>• Replace the SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.)<br>**[Past malfunction diagnosis]**<br>• DTC troubleshooting completed. |
| | | No | DTC troubleshooting completed. |

# 08-03 SYMPTOM TROUBLESHOOTING

**TROUBLESHOOTING INDEX. . . . . 08-03–1**
**NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE . . . . . 08-03–1**
Diagnostic Procedure. . . . . **08-03–1**
**NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES CONSTANTLY . . . . . .08-03–3**
Diagnostic Procedure . . . . . .**08-03–3**

## TROUBLESHOOTING INDEX

id080300802000

- Use the chart below verify the symptoms of the trouble in order to diagnose the appropriate area.

| No. | Troubleshooting item | Description | Page |
|---|---|---|---|
| 1 | Air bag system warning light does not illuminate. | Malfunction in air bag system warning light circuit (short to ground). | (See 08-03-1 NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE) |
| 2 | Air bag system warning light is illuminated constantly. | Malfunction in air bag system warning light circuit (open circuit or short to power supply). | (See 08-03-3 NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES CONSTANTLY) |

## NO.1 AIR BAG SYSTEM WARNING LIGHT DOES NOT ILLUMINATE

id080300800200

| **1** | **Air bag system warning light does not illuminate.** |
|---|---|
| **DETECTION CONDITION** | Malfunction in air bag system warning light circuit (short to ground) |
| **POSSIBLE CAUSE** | • SAS control module malfunction<br>• Instrument cluster (circuit board) malfunction<br>• Short to ground circuit in wiring harness between instrument cluster and SAS control module |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT OTHER WARNING AND INDICATOR LIGHTS CIRCUIT IN INSTRUMENT CLUSTER**<br>• Turn the ignition switch to the ON position.<br>• Do other warning and indicator lights illuminate? | Yes | Turn the ignition switch to the LOCK position, then go to the next step. |
| | | No | Inspect the instrument cluster power supply system and ground system, then go to Step 4. |
| 2 | **INSPECT DTCS IN SAS CONTROL MODULE**<br>• Inspect the DTC for the SAS control module on-board diagnostic system.<br>• Have DTCs been recorded in memory? | Yes | Perform the applicable DTC inspection, then go to Step 5. (See 08-02-4 DTC TABLE.) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT SAS CONTROL MODULE**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the air baga system service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more.**<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side front seat connectors.<br>• Remove the C-pillar trim. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trim. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connectors.<br>• Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver- and passenger-side pre-tensioner seat belt connectors.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to ON position.<br>• Does the air bag system warning light illuminate? | Yes | Replace the SAS control module, then go to Step 5. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | **INSPECT DTCS IN INSTRUMENT CLUSTER**<br>• Inspect the DTC for the instrument cluster on-board diagnostic system.<br>• Have DTCs been recorded in memory? | Yes | Perform the applicable DTC inspection, then go to the next step. (See 09-02E-1 DTC TABLE[INSTRUMENT CLUSTER].) |
| | | No | Inspect the instrument cluster warning lights using check code, then go to the next step. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR**<br>• Turn the ignition switch to LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect all SAS control module connectors.<br>• Connect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Connect the driver and passenger-side curtain air bag module connectors.<br>• Connect the driver and passenger-side front seat connectors.<br>• Connect the passenger-side air bag module connector.<br>• Connect the clock spring connector.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to ON position.<br>• Does the air bag system warning light operate properly? | Yes | Complete troubleshooting, then explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs. |

### NO.2 AIR BAG SYSTEM WARNING LIGHT ILLUMINATES CONSTANTLY

id080300800300

| 2 | **Air bag system warning light is illuminated constantly.** |
|---|---|
| **DETECTION CONDITION** | Malfunction in air bag system warning light circuit (open circuit or short to power supply). |
| **POSSIBLE CAUSE** | • Weak battery<br>• SAS control module malfunction<br>• Instrument cluster (circuit board) malfunction<br>• No connection in SAS control module connector<br>• Poor contact in instrument cluster connector (20-pin)<br>• Open or short to power supply circuit in wiring harness between instrument cluster and SAS control module<br>• Poor contact at terminals 1X and/or 1W of SAS control module connector<br>• Poor contact in wiring harness between terminal 1X of SAS control module connector and ground<br>• Poor contact in wiring harness between battery and terminal 1W of SAS control module |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT BATTERY**<br>• Measure the voltage of battery.<br>• Is the voltage **9 V or more**? | Yes | Go to the next step. |
| | | No | Battery is weak.<br>Inspect charge/discharge system, then go to Step 10.<br>(See 01-17-2 BATTERY INSPECTION[L3 WITH TC].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **VERIFY THAT SAS CONTROL MODULE CONNECTOR IS CONNECTED**<br><br>**Warning**<br>• **Handling the air bag system components improperly can accidentally deploy the air bag modules and pre-tensioner seat belts, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag system components. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**<br><br>• Turn the ignition switch to LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Are all SAS control module connectors securely connected? | Yes | Go to the next step. |
| | | No | Reconnect the connector properly, then go to Step 10. |
| 3 | **INSPECT DTCS IN INSTRUMENT CLUSTER**<br>• Inspect the DTC for the instrument cluster on-board diagnostic system.<br>• Has DTC U0264 been recorded in memory? | Yes | Go to the next step. |
| | | No | Inspect the instrument cluster. (See 09-22-3 INSTRUMENT CLUSTER INSPECTION.) |
| 4 | **INSPECT DTCS IN SAS CONTROL MODULE**<br>• Inspect the DTC for the SAS control module on-board diagnostic system.<br>• Have DTCs been recorded in memory? | Yes | Perform the applicable DTC inspection, then go to Step 10. (See 08-02-4 DTC TABLE.) |
| | | No | Go to the next step. |
| 5 | **INSPECT DTCS IN INSTRUMENT CLUSTER**<br>• Inspect the DTC for the instrument cluster on-board diagnostic system.<br>• Have DTCs been recorded in memory? | Yes | Perform the applicable DTC inspection, then go to Step 10. (See 09-02E-1 DTC TABLE[INSTRUMENT CLUSTER].) |
| | | No | Go to the next step. |
| 6 | **INSPECT INSTRUMENT CLUSTER**<br>• Inspect the instrument cluster warning lights using check code. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)<br>• Are the check results okay? | Yes | Go to the next step. |
| | | No | Repair or replace the instrument cluster according to inspection results.<br>Then go to Step 10. |
| 7 | **INSPECT POWER SUPPLY CIRCUIT OF SAS CONTROL MODULE (TERMINAL 1W)**<br>• Turn the ignition switch to LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more**.<br>• Connect all SAS control module connectors.<br>• Connect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Connect the driver and passenger-side curtain air bag module connectors.<br>• Connect the driver and passenger-side front seat connectors.<br>• Connect the passenger-side air bag module connector.<br>• Connect the clock spring connector.<br>• Inspect the voltage for PID/DATA monitor IGN_V_2 item using M-MDS.<br>• Is the voltage of at least one terminal **8 V—16 V**? | Yes | Go to the Step 9. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **INSPECT WIRING HARNESS BETWEEN BATTERY AND FUSE BLOCK**<br>• Connect the negative battery cable.<br>• Turn the ignition switch to ON position.<br>• Measure the voltage at instrument cluster connector terminal 2G.<br>• Is the voltage **8 V— 16 V**? | Yes | Go to the next step. |
| | | No | Repair the wiring harnesses, then go to Step 10. |
| 9 | **VERIFY THAT SAS CONTROL MODULE CONNECTOR TERMINAL 1X IS GROUND**<br>• Turn the ignition switch to LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more.**<br>• Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.)<br>• Disconnect the clock spring connector.<br>• Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.)<br>• Disconnect the passenger-side air bag module connector.<br>• Disconnect the driver and passenger-side side air bag module connectors.<br>• Remove the C-pillar trims. (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Remove the D-pillar trims. (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)<br>• Disconnect the driver and passenger-side curtain air bag module connectors.<br>• Remove the B-pillar lower trims. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.)<br>• Disconnect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)<br>• Disconnect all SAS control module control model connectors.<br>• Inspect the wiring harness between SAS control module connector terminal 1X and ground for the following:<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Replace the SAS control module, then go to the next step. (See 08-10-10 SAS CONTROL MODULE REMOVAL/ INSTALLATION.) |
| | | No | Replace the wiring harnesses, then go to the next step. |
| 10 | **CONFIRM THAT MALFUNCTION SYMPTOMS DO NOT RECUR AFTER REPAIR**<br>• Turn the ignition switch to LOCK position.<br>• Disconnect the negative battery cable and wait for **1 min or more.**<br>• Connect all SAS control module connectors.<br>• Connect the driver and passenger-side pre-tensioner seat belt connectors.<br>• Connect the driver and passenger-side curtain air bag module connectors.<br>• Connect the driver and passenger-side front seat connectors.<br>• Connect the passenger-side air bag module connector.<br>• Connect the clock spring connector.<br>• Connect the instrument cluster connector.<br>• Connect the negative battery cable.<br>• Turn the ignition switch to ON position.<br>• Does the air bag system warning light operate properly? | Yes | Complete troubleshooting, then explain repairs to customer. |
| | | No | Recheck malfunction symptoms, then repeat from Step 1 if malfunction recurs. |

# 08-10 AIR BAG SYSTEM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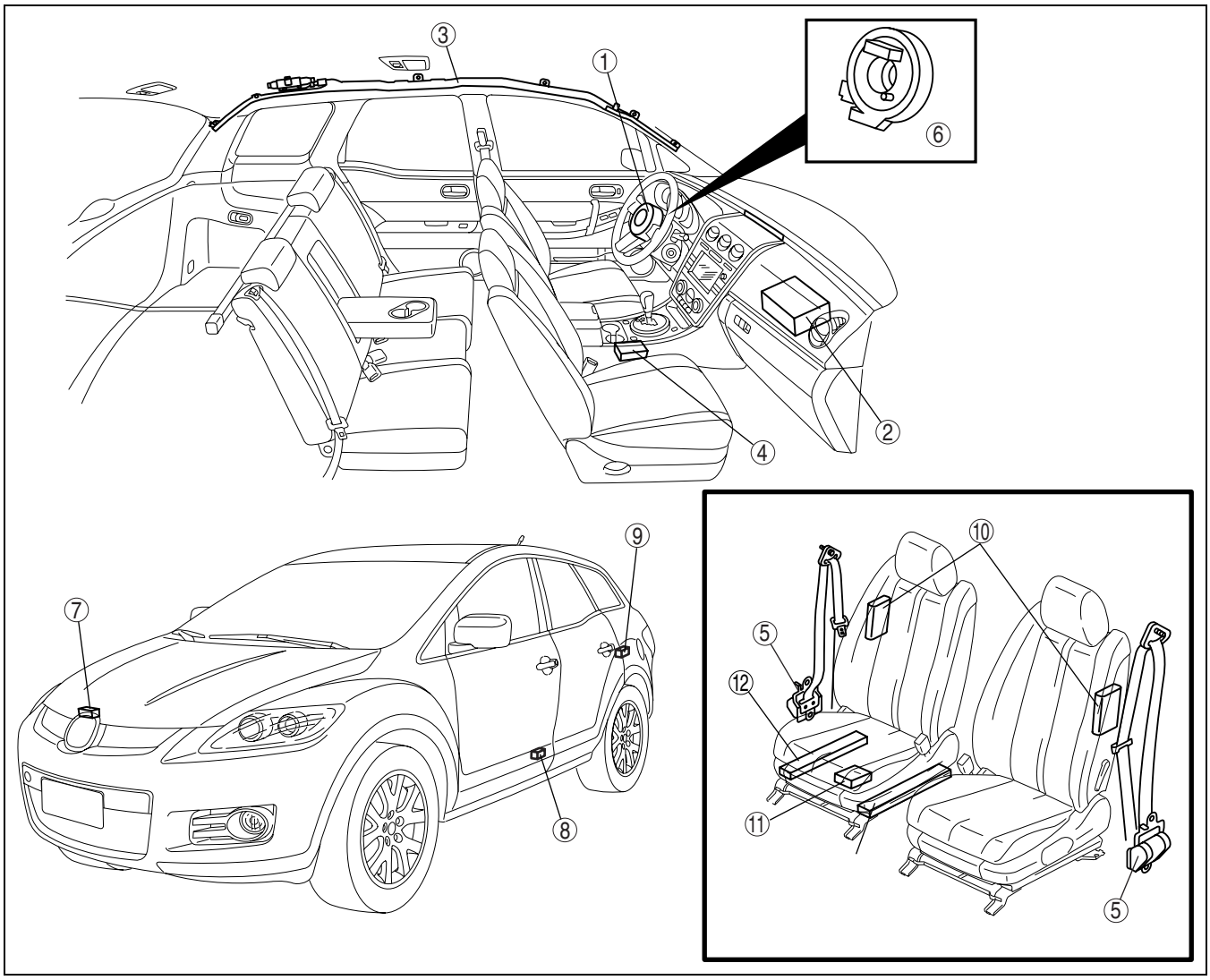


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| | |
|---|---|
| 1 | Driver-side air bag module<br>(See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)<br>(See 08-10-17 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES.) |
| 2 | Passenger-side air bag module<br>(See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)<br>(See .08-10-17 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES) |
| 3 | Curtain air bag module<br>(See 08-10-8 CURTAIN AIR BAG MODULE REMOVAL/INSTALLATION.)<br>(See 08-10-17 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES.) |
| 4 | SAS control module<br>(See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.) |
| 5 | Pre-tensioner seat belt<br>(See 08-10-17 AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES.) |
| 6 | Clock spring<br>(See 08-10-15 CLOCK SPRING REMOVAL/INSTALLATION.)<br>(See 08-10-16 CLOCK SPRING INSPECTION.)<br>(See 08-10-15 CLOCK SPRING ADJUSTMENT.) |
| 7 | Crash zone sensor<br>(See 08-10-10 CRASH ZONE SENSOR REMOVAL/INSTALLATION.) |
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| 11 | Seat weight sensor control module<br>(See 08-10-11 SEAT WEIGHT SENSOR CONTROL MODULE REMOVAL/INSTALLATION.) |

| | |
|---|---|
| 12 | Seat weight sensor<br>(See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)<br>(See 08-10-12 SEAT WEIGHT SENSOR INSPECTION.) |

## AIR BAG SYSTEM SERVICE WARNINGS

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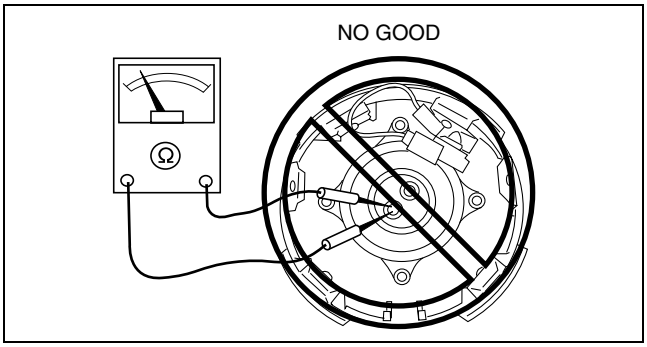
**Air Bag Module Inspection**

- **Inspecting an air bag module using a tester can operate (deploy) the air bag module, which may cause serious injury. Do not use a tester to inspect an air bag module. Always use the on-board diagnostic function to diagnose the air bag module for malfunctions.**

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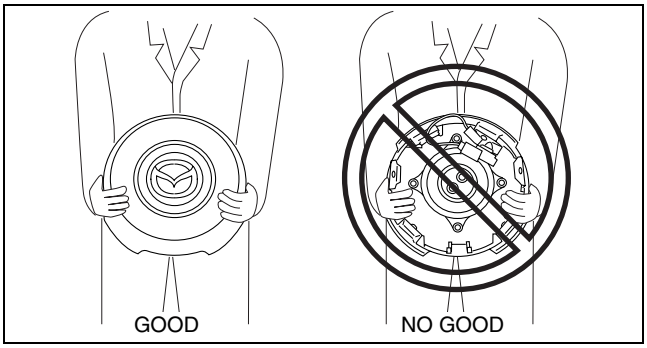
**Air Bag Module Handling**

- **Before removing the air bag module or disconnecting the air bag module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **Handling a live (undeployed) air bag module that is pointed toward your body could result in serious injury if the air bag module were to accidentally operate (deploy). When carrying a live (undeployed) air bag module, point the deployment surface away from your body to lessen the chance of injury in case it operates (deploys).**

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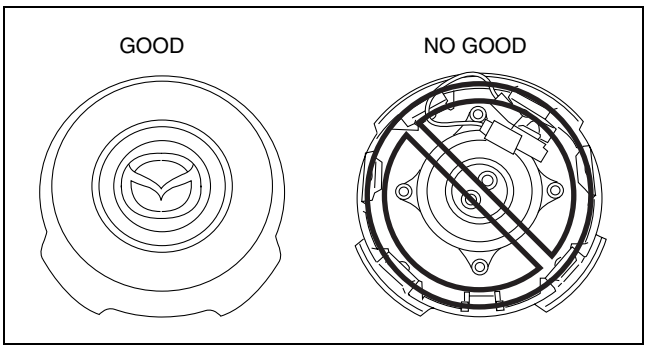
- **A live (undeployed) air bag module placed with its deployment surface to ground is dangerous. If the air bag module were to accidentally operate (deploy), it could cause serious injury. Always place a live (undeployed) air bag module with its deployment surface up.**

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**Side Air Bag Module Handling**

- **Before removing the side air bag module or disconnecting the side air bag module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **When a side air bag module operates (deploys) due to a collision, the interior of the seat back (pad, frame, trim) may become damaged. If a side air bag does not operate (deploy) normally from a seat back that has been reused, a serious accident may result. After a side air bag has operated (deployed), always replace both the side air bag module and the seat back (pad, frame, trim) with new parts. After servicing, verify that the seat operates normally and that the wiring harness is not caught.**

**Seat Weight Sensor Handling**

- **The passenger-side seat and the seat weight sensor may become deformed or otherwise damaged due to operation (deployment) of the front or side air bag in an accident. This may cause the passenger sensing function to operate improperly and result in a serious accident. Always replace the passenger seat and seat weight sensor with new ones after the front or side air bags have operated (deployed). After servicing, verify that the seat operates normally and that the wiring harness is not caught. If the collision is not hard enough to cause the front or side air bags to operate (deploy), inspect the seat weight sensor and replace it if there is any malfunction.**

**SAS Control Module Handling**

- **Removing the SAS control module or disconnecting the SAS control module connector with the ignition switch at the ON position can activate the sensor in the SAS control module and operate (deploy) the air bags and pre-tensioner seat belts, which may cause serious injury. Before removing the SAS control module or disconnecting the SAS control module connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **Connecting the SAS control module connector with the SAS control module not securely fixed to the vehicle is dangerous. The sensor in the SAS control module could send an electrical signal to the air bag modules and pre-tensioner seat belts. This will operate (deploy) the air bags and pre-tensioner seat belts, which may result in serious injury. Therefore, before connecting the connector, securely fix the SAS control module to the vehicle.**
- **Because a sensor is built into the SAS control module, once the air bags and pre-tensioner seat belts have operated (deployed) due to a collision or other causes, the SAS control module must be replaced with a new one even if the used one does not have any visible external damage or deformation. The used SAS control module may have been damaged internally, which may cause improper operation. If the SAS control module is reused, the air bags and pre-tensioner seat belts may not operate (deploy) normally, which could result in a serious accident. Always replace the SAS control module with a new one. The SAS control module cannot be bench-checked or self-checked.**

**Crash Zone Sensor Handling**

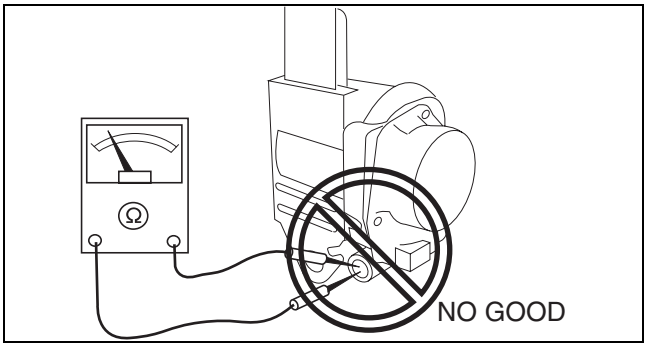
- **Removing the crash zone sensor or disconnecting the crash zone sensor connector with the ignition switch at the ON position can activate the crash zone sensor and operate (deploy) the air bags and pre-tensioner seat belts, which may cause serious injury. Before removing the crash zone sensor or disconnecting the crash zone sensor connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **If the crash zone sensor is subjected to shock or the sensor is disassembled, the air bags and pre-tensioner seat belts may accidentally operate (deploy) and cause injury, or the system may fail to operate normally and cause a serious accident. Do not subject the crash zone sensor to shock or disassemble the sensor.**
- **Because a sensor is built into the crash zone sensor, once the air bags and pre-tensioner seat belts have operated (deployed) due to a collision or other causes, the crash zone sensor must be replaced with a new one even if the used one does not have any visible external damage or deformation. If the crash zone sensor is reused, the air bags and pre-tensioner seat belts may not operate (deploy) normally, which could result in a serious accident. Always replace the crash zone sensor with a new one. The crash zone sensor cannot be bench-checked or self-checked.**

**Side Air Bag Sensor Handling**

- **Removing the side air bag sensor or disconnecting the side air bag sensor connector with the ignition switch at the ON position can activate the side air bag sensor and operate (deploy) the side air bag, which may cause serious injury. Before removing the side air bag sensor or disconnecting the side air bag sensor connector, always turn the ignition switch to the LOCK position, disconnect the negative battery cable, and then wait for 1 min or more to allow the backup power supply of the SAS control module to deplete its stored power.**
- **If the side air bag sensor is subjected to shock or the sensor is disassembled, the side air bag may accidentally operate (deploy) and cause injury, or the system may fail to operate normally and cause a serious accident. Do not subject the side air bag sensor to shock or disassemble the sensor.**
- **Because a sensor is built into the side air bag sensor, once the air bag has operated (deployed) due to a collision or other causes, the side air bag sensor must be replaced with a new one even if the used one does not have any visible external damage or deformation. If the side air bag sensor is reused, the side air bag may not operate (deploy) normally, which could result in a serious accident. Always replace the side air bag sensor with a new one. The side air bag sensor cannot be bench-checked or self-checked.**

**Pre-tensioner Seat Belt Inspection**

- **Inspecting a pre-tensioner seat belt using a tester can operate (deploy) the pre-tensioner seat belt, which may cause serious injury. Do not use a tester to inspect a pre-tensioner seat belt. Always use the on-board diagnostic function to diagnose the pre-tensioner seat belt for malfunctions.**

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**AIR BAG SYSTEM SERVICE CAUTIONS**

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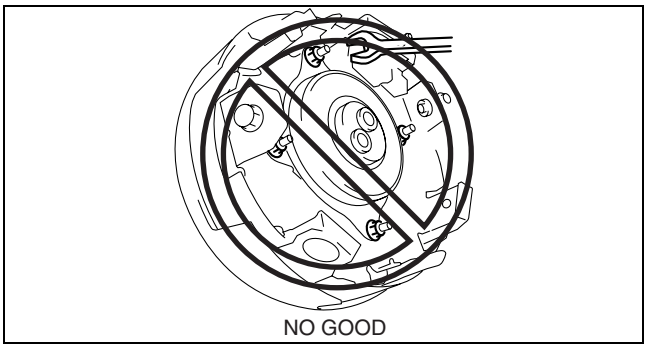
**Air Bag System Component Disassembly**

- **Disassembling the air bag system components could cause it to not operate (deploy) normally. Never disassemble any air bag system components.**

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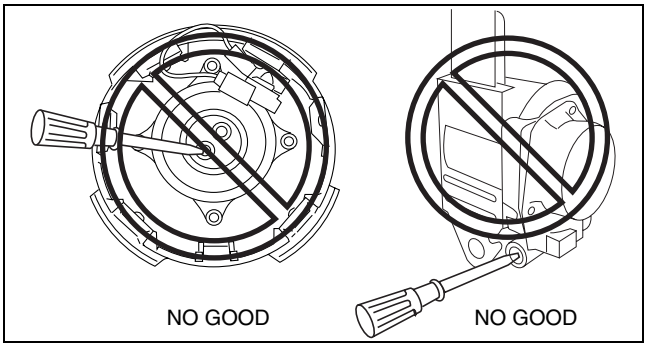
**Air Bag Module, Pre-tensioner Seat Belt Handling**

- **Oil, grease, or water on the air bag modules may cause the air bags and pre-tensioner seat belts to fail to operate (deploy) in an accident. Never allow oil, grease, or water to get on the air bag modules or pre-tensioner seat belts.**
- **Inserting a screwdriver or similar object into the connector of an air bag module or a pre-tensioner seat belt may damage the connector and cause the air bag module or the pre-tensioner seat belt to operate (deploy) improperly, which may cause serious injury. Never insert any foreign objects into the air bag module or seat belt connectors.**

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**Seat Weight Sensor Handling**

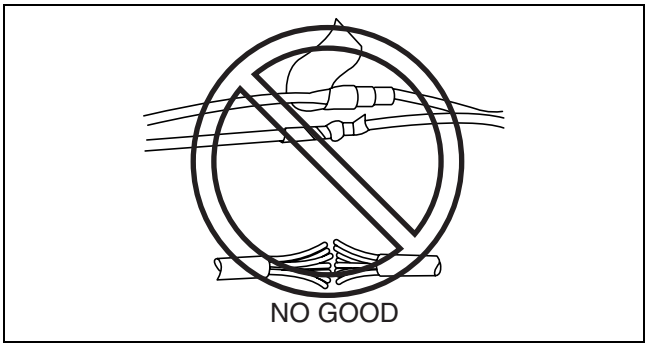
- **The seat weight sensor has a built-in strain gauge which may operate improperly if the sensor is dropped by itself or when installed to the seat. If it is dropped, replace the seat weight sensor with a new one.**
- **Oil, grease, or water on the seat weight sensor may cause the system to operate (deploy) improperly. Never allow oil, grease, or water to get on the seat weight sensor.**
- **Foreign material in the seat weight sensor components may cause the system to operate (deploy) improperly. Always make sure that no foreign material can get into the seat weight sensor.**
- **Disassembling the seat weight sensor, or tightening any of the nuts and bolts installed to the sensor body may cause it to operate (deploy) improperly. Never disassemble the seat weight sensor or tighten any of the nuts or bolts installed to the body of the sensor.**

**Air Bag Module, Pre-tensioner Seat Belt Reuse**

- **Even if an air bag module or a pre-tensioner seat belt does not operate (deploy) in a collision and does not have any external signs of damage, it may have been damaged internally, which may cause improper operation. Before reusing a live (undeployed) air bag module and the pre-tensioner seat belts, always use the on-board diagnostic to diagnose the air bag module and the pre-tensioner seat belts to verify that they have no malfunction.**

**Air Bag Wiring Harness Repair**

- **Incorrectly repairing an air bag wiring harness can accidentally operate (deploy) the air bag module and pre-tensioner seat belts. If a problem is found in the air bag wiring harness, always replace the wiring harness with a new one.**

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**DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION**

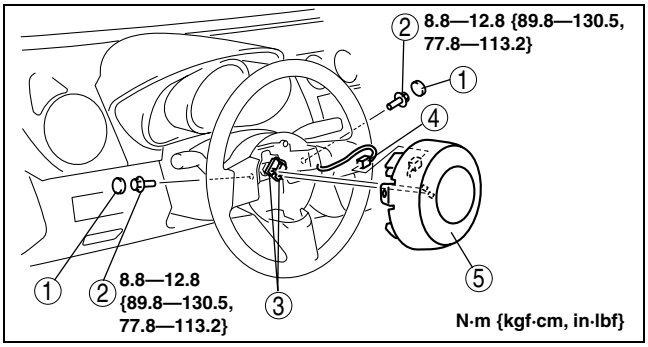
id081000801300

**Warning**

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more**.
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Cover |
| 2 | Bolt |
| 3 | Connector A<br>(See 08-10-6 Connector A Removal Note.) |
| 4 | Connector B |
| 5 | Driver-side air bag module |

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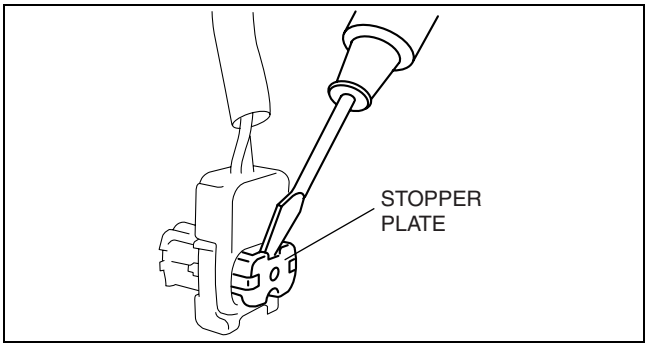
4. Install in the reverse order of removal.
5. Turn the ignition switch to the ON position.
6. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector A Removal Note**

1. Using a flathead screwdriver, pry out the connector stopper plate.
2. Disconnect the connector.

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## PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION

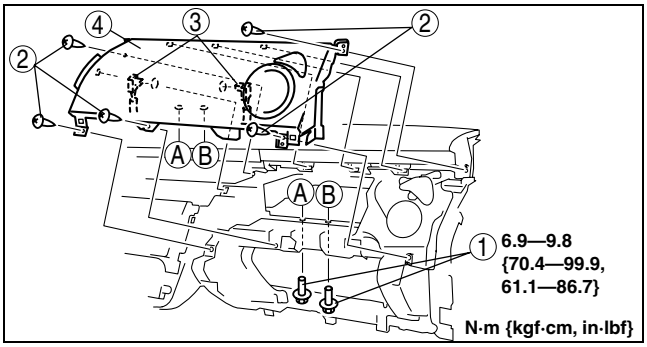
id081000801900

**Warning**

- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**
- **Due to the adoption of 2-step deployment control in the passenger-side air bag module, depending on the impact force, it is possible that inflator No.2 might not deploy. In such cases, before disposing of the air bag module, make sure to follow the inflator deployment procedures and verify complete deployment of inflators No.1 and 2.**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more**.
3. Remove the following parts:
   (1) Front scuff plate inner (passenger's side) (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (passenger's side) (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (6) Hood release (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (7) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (8) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Screw |
| 3 | Connector<br>(See 08-10-7 Connector Removal Note.) |
| 4 | Passenger-side air bag module |

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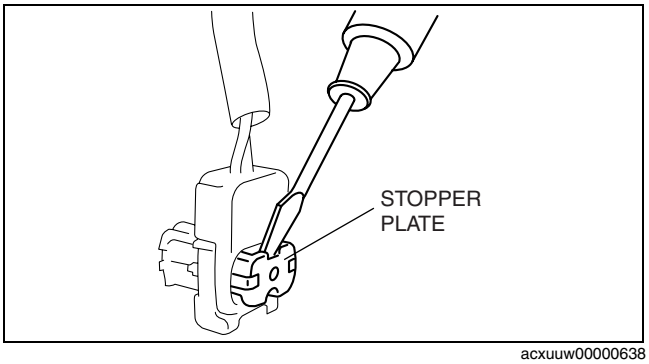
5. Install in the reverse order of removal.
6. Turn the ignition switch to the ON position.
7. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector Removal Note**

1. Using a flathead screwdriver, pry out the connector stopper plate.
2. Disconnect the connector.

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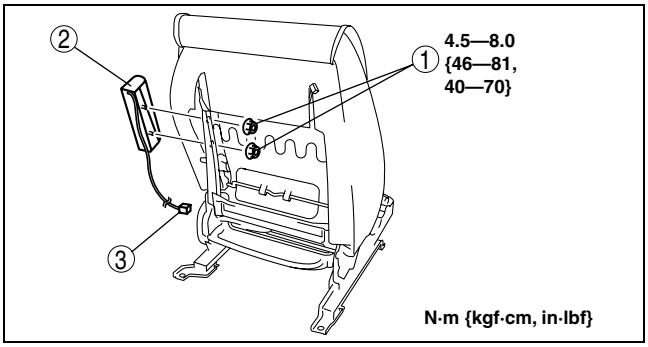
## SIDE AIR BAG MODULE REMOVAL/INSTALLATION

id081000800800

**Warning**
- **Handling the air bag module improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**
- **If the side air bag module is installed with debris in the seat back, the foreign material may be scattered when the side air bag module operates (deploys), causing injury. Verify that there is no foreign material in the seat back before installing the side air bag module.**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more**.
3. Remove the front seat. (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
4. Partially peel back the seat back trim.
5. Partially peel back the seat back pad.
6. Remove the seat cushion frame. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.)
7. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Nut |
| 2 | Side air bag module |
| 3 | Connector |

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8. Install in the reverse order of removal.
9. Turn the ignition switch to the ON position.
10. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
    - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

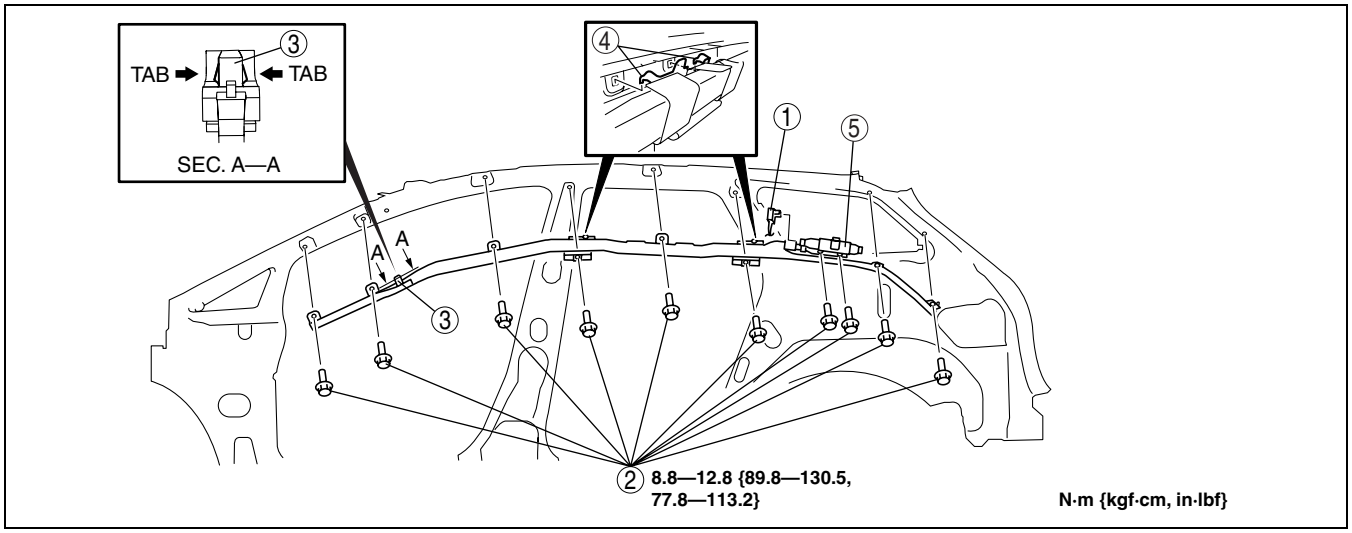
## CURTAIN AIR BAG MODULE REMOVAL/INSTALLATION

id081000800900

**Warning**
- **Handling the air bag module improperly can accidentally deploy the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more.**
3. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15) Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17) Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
   (18) Rear speaker (See 09-20-8 REAR SPEAKER REMOVAL/INSTALLATION.)

4. Remove in the order indicated in the table.

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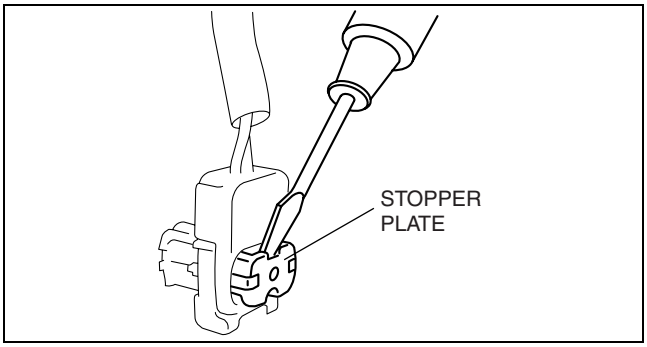
| | |
|---|---|
| 1 | Connector<br>(See 08-10-9 Connector Removal Note.) |
| 2 | Bolt |
| 3 | Clip |
| 4 | Hook |
| 5 | Curtain air bag module |



5. Install in the reverse order of removal.
6. When the ignition switch is turned to the ON position verify that the air bag system warning light illuminates for **approx. 6 s and goes out.**
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector Removal Note**

1. Using flathead screwdriver, pry out the connector stopper plate.
2. Disconnect the connector.

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## CRASH ZONE SENSOR REMOVAL/INSTALLATION

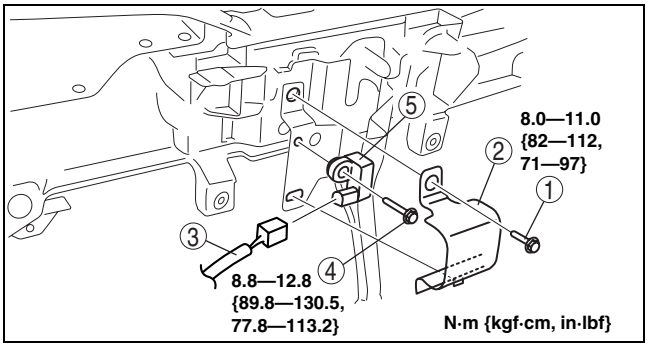
id081000800500

**Warning**

- **Handling the crash zone sensor improperly can accidentally deploy the air bags and pre-tensioner seat belts, which may seriously injure you. Read the air bag system service warnings and cautions before handling the crash zone sensor. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more**.
3. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt A |
| 2 | Cover |
| 3 | Connector<br>(See 08-10-10 Connector Removal Note.) |
| 4 | Bolt B |
| 5 | Crash zone sensor |

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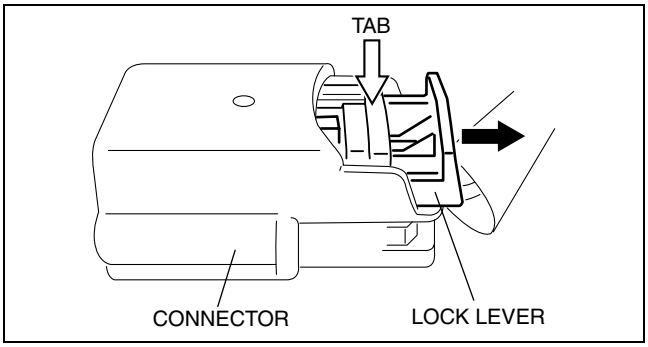
5. Install in the reverse order of removal.
6. Turn the ignition switch to the ON position.
7. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector Removal Note**

1. Disconnect the connector from the crash zone sensor by pressing the connector tab and pulling out the lock lever in the direction of the arrow.

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## SAS CONTROL MODULE REMOVAL/INSTALLATION

id081000801400

**Warning**

- **Handling the SAS control module improperly can accidentally deploy the air bag modules and pre-tensioner seat belt, which may seriously injure you. Read the air bag system service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**
- **Connecting the SAS control module with the SAS control module not securely fixed to the vehicle is dangerous. When the ignition switch is turned to the ON position, the SAS control module could tilt causing the SAS control module to detect that the vehicle is in a rollover condition, which may accidentally operate (deploy) the curtain air bag module and pre-tensioner seat belt. Therefore, before turning the ignition switch to the ON position with the connector connected, securely fix the SAS control module to the vehicle.**

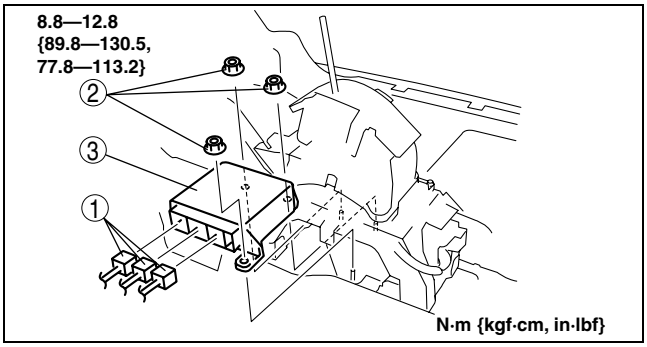
**Caution**

- **Handling the SAS control module improperly can accidentally deploy the air bag modules and pre-tensioner seat belt, which may seriously injure you. If configuration is not completed before removing the SAS control module, DTC B2477 or B1017 will be displayed.**

1. Perform SAS control module configuration when replacing it. (See 08-10-11 SAS CONTROL MODULE CONFIGURATION.)
2. Turn the ignition switch to the LOCK position.

3. Disconnect the negative battery cable and wait for **1 min or more**.
4. Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
5. Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Nut |
| 3 | SAS control module |



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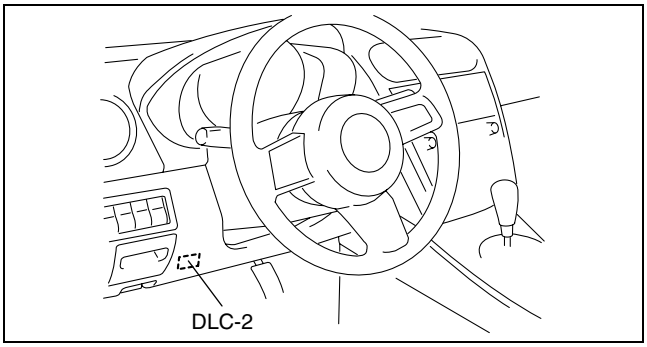
7. Install in the reverse order of removal.
8. Turn the ignition switch to the ON position.
   - If the SAS control module is replaced, turn the ignition switch to the ON position for **20 s or more** after completing the configuration. (See 08-10-11 SAS CONTROL MODULE CONFIGURATION.)
9. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

### SAS CONTROL MODULE CONFIGURATION

id081000801500

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Module Programming”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Programmable Module Installation”.
   2. Select “RCM”.
4. Perform the configuration according to the directions on the screen.



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### SEAT WEIGHT SENSOR CONTROL MODULE REMOVAL/INSTALLATION

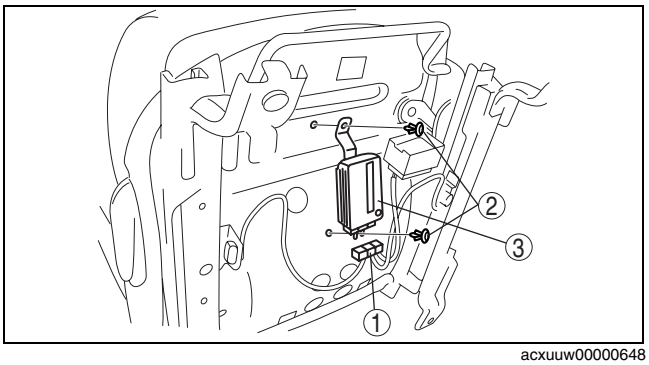
id081000801600

**Caution**
- **When the seat weight sensor control module is replaced with a new one, perform the seat weight sensor calibration using the M-MDS. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for**1 min or more.**
3. Remove the front passenger’s seat. (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Fastener |
| 3 | Seat weight sensor control module |

5. Install in the reverse order of removal.



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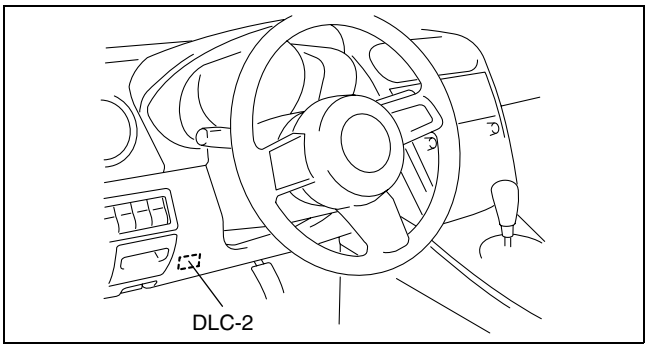
## SEAT WEIGHT SENSOR CALIBRATION

id081000801700

**Caution**
- **If any of the following work is performed, perform the seat weight sensor calibration using the M-MDS.**
  - **— Replacement with a new seat weight sensor**
  - **— Replacement with a new seat weight sensor control module**
  - **— Replacement with new passenger-side seat parts**
  - **— Disassembly of the passenger-side seat**
- **If any of the following work is performed, perform the seat weight sensor inspection using the M-MDS. (See 08-10-12 SEAT WEIGHT SENSOR INSPECTION.)**
  - **— Removal of the passenger-side seat**
  - **— Loosening and retightening of passenger's seat fixing bolts**
  - **— Or, the vehicle is involved in a collision**

1. Have two **20 kg {44 lb} weights ready to use.**
2. Connect the M-MDS to the DLC-2 connector.
3. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select "Body".
     2. Select "Restraints".
   - When using the PDS (pocket PC)
     1. Select "All Tests and Calibrations".
4. Then, select item from the screen menu in the following order.
   1. Select "Passenger Seat Weight Sensor ReZero".
5. Perform calibration following the procedures on the M-MDS screen.

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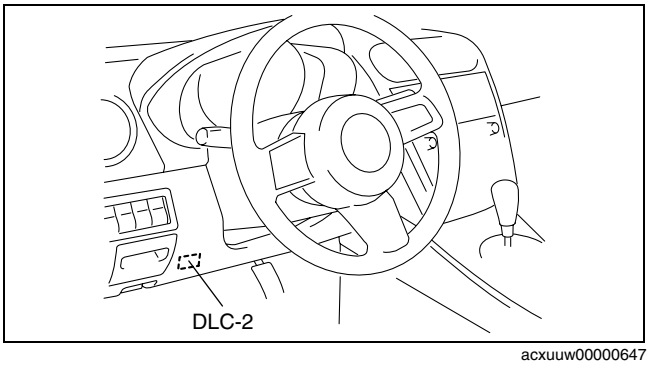
## SEAT WEIGHT SENSOR INSPECTION

id081000801800

**Caution**
- **If any of the following work is performed, perform the seat weight sensor inspection using the M-MDS.**
  - **— Removal of the passenger-side seat**
  - **— Loosening and retightening of passenger's seat fixing bolts**
  - **— Or, the vehicle is involved in a collision**
- **If any of the following work is performed, perform the seat weight sensor calibration using the M-MDS. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)**
  - **— Replacement with a new seat weight sensor**
  - **— Replacement with a new seat weight sensor control module**
  - **— Replacement with new passenger-side seat parts**
  - **— Disassembly of the passenger-side seat**

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select "Body".
     2. Select "Restraints".
   - When using the PDS (pocket PC)
     1. Select "All Tests and Calibrations".
3. Then, select item from the screen menu in the following order.
   1. Select "Passenger Seat Weight Sensor ReZero".
4. Perform inspection following the procedures on the M-MDS screen.

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## SIDE AIR BAG SENSOR NO. 1 REMOVAL/INSTALLATION

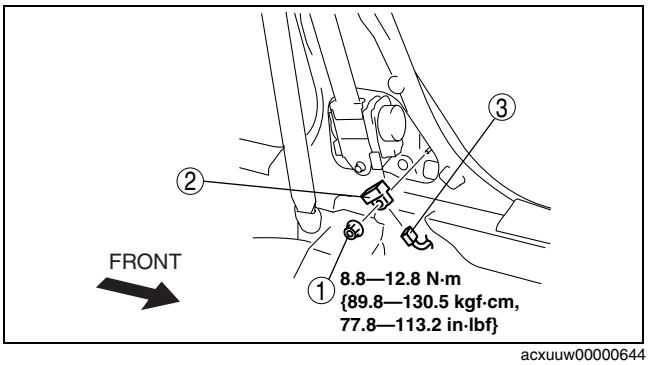
id081000800600

**Warning**

- **Handling the side air bag sensor improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the side air bag sensor. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more.**
3. Remove the following parts:
   (1) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (3) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Nut |
| 2 | Side air bag sensor No. 1 |
| 3 | Connector<br>(See 08-10-13 Connector Removal Note.) |

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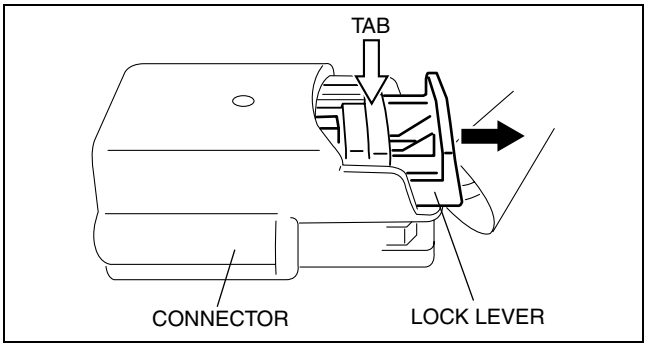
5. Install in the reverse order of removal.
6. Turn the ignition switch to the ON position and hold for **10 s or more**.
7. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector Removal Note**

1. Disconnect the connector from the side air bag sensor No.1 by pressing the connector tab and pulling out the lock lever in the direction of the arrow.

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## SIDE AIR BAG SENSOR NO. 2 REMOVAL/INSTALLATION

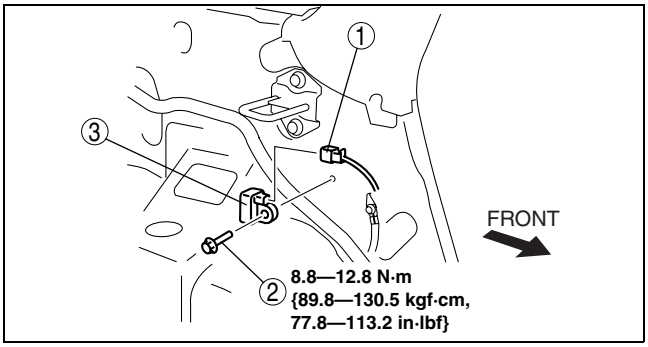
id081000800700

**Warning**

- **Handling the side air bag sensor improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the air bag system service warnings and cautions before handling the side air bag sensor. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1 min or more**.
3. Remove the following parts:
   (1) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (2) Rear scuff plate inner. (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector<br>(See08-10-14 Connector Removal Note.) |
| 2 | Side air bag sensor No. 2 |
| 3 | Bolt |

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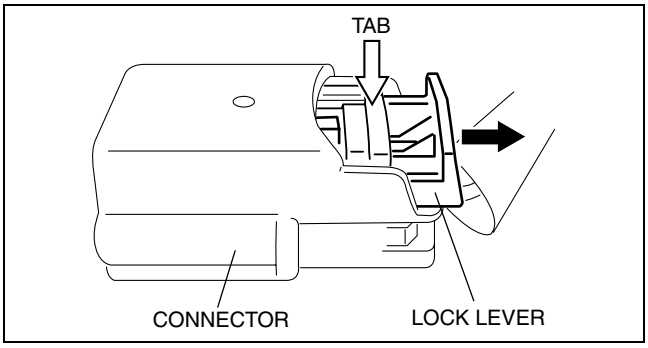
5. Install in the reverse order of removal.
6. Turn the ignition switch to the ON position and hold for **10 s or more**.
7. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector Removal Note**

1. Disconnect the connector from the side air bag sensor No.2 by pressing the connector tab and pulling out the lock lever in the direction of the arrow.

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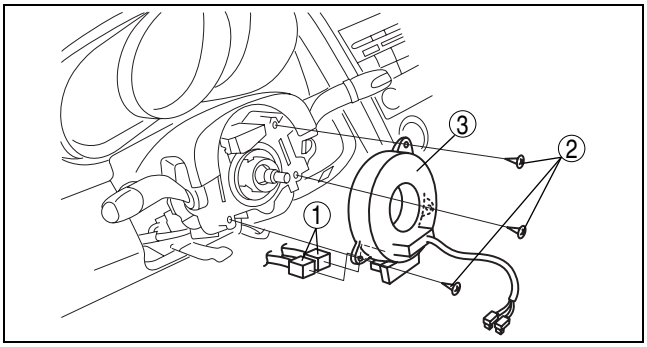
## CLOCK SPRING REMOVAL/INSTALLATION

id081000802000

1. Disconnect the negative battery cable and wait for **1 min or more.**
2. Remove the following parts:
   (1) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (2) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (3) Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Screw |
| 3 | Clock spring |



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4. Install in the reverse order of removal.
5. Turn the ignition switch to the ON position.
6. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light does not operate normally, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

## CLOCK SPRING ADJUSTMENT

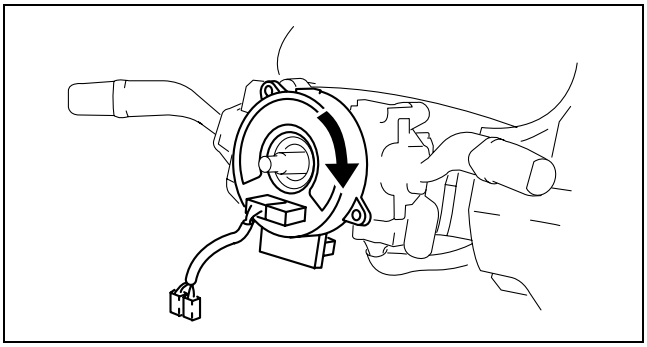
id081000802100

**Note**
- The adjustment procedure is also specified on the caution label of the clock spring.

1. Set the front tires straight-ahead.

**Caution**
- **The clock spring will break if over-wound. Do not forcibly turn the clock spring.**

2. Turn the clock spring clockwise until it stops.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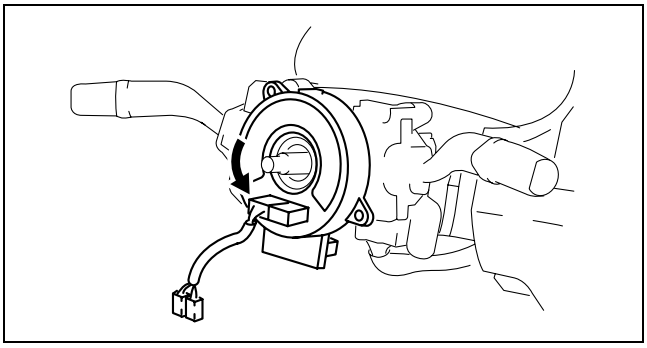
3. From the stopped position, turn the clock spring counterclockwise **2 3/4 turns**.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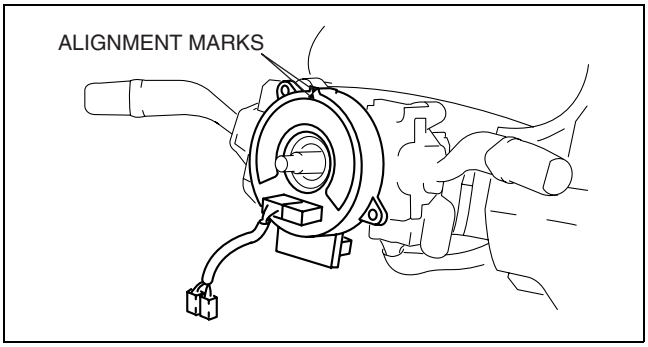
4. Align the marks.

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## CLOCK SPRING INSPECTION

id081000802200

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the clock spring.

**Note**
- When the vehicle-side connector for the clock spring is disconnected, terminals 1A, 1B, 1C and 1D are shorted to prevent unexpected operation (deployment) of the air bag module.

○—○ : Continuity

| Test condition | Terminal | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1A | 1B | 1C | 1D | 2A | 2B | 2C | 2D | 2E | 2G | 2H | 3A | 3B | 4A | 4B | 5A | 5B | 5C | 5D | 5E | 5G | 5H |
| Under any condition | ○ | ○ | | | | | | | | | | | | ○ | ○ | | | | | | | |
| | | | ○ | ○ | | | | | | | | ○ | ○ | | | | | | | | | |
| | | | | | ○ | | | | | | | | | | | ○ | | | | | | |
| | | | | | | ○ | | | | | | | | | | | ○ | | | | | |
| | | | | | | | ○ | | | | | | | | | | | ○ | | | | |
| | | | | | | | | ○ | | | | | | | | | | | ○ | | | |
| | | | | | | | | | ○ | | | | | | | | | | | ○ | | |
| | | | | | | | | | | ○ | | | | | | | | | | | ○ | |
| | | | | | | | | | | | ○ | | | | | | | | | | | ○ |

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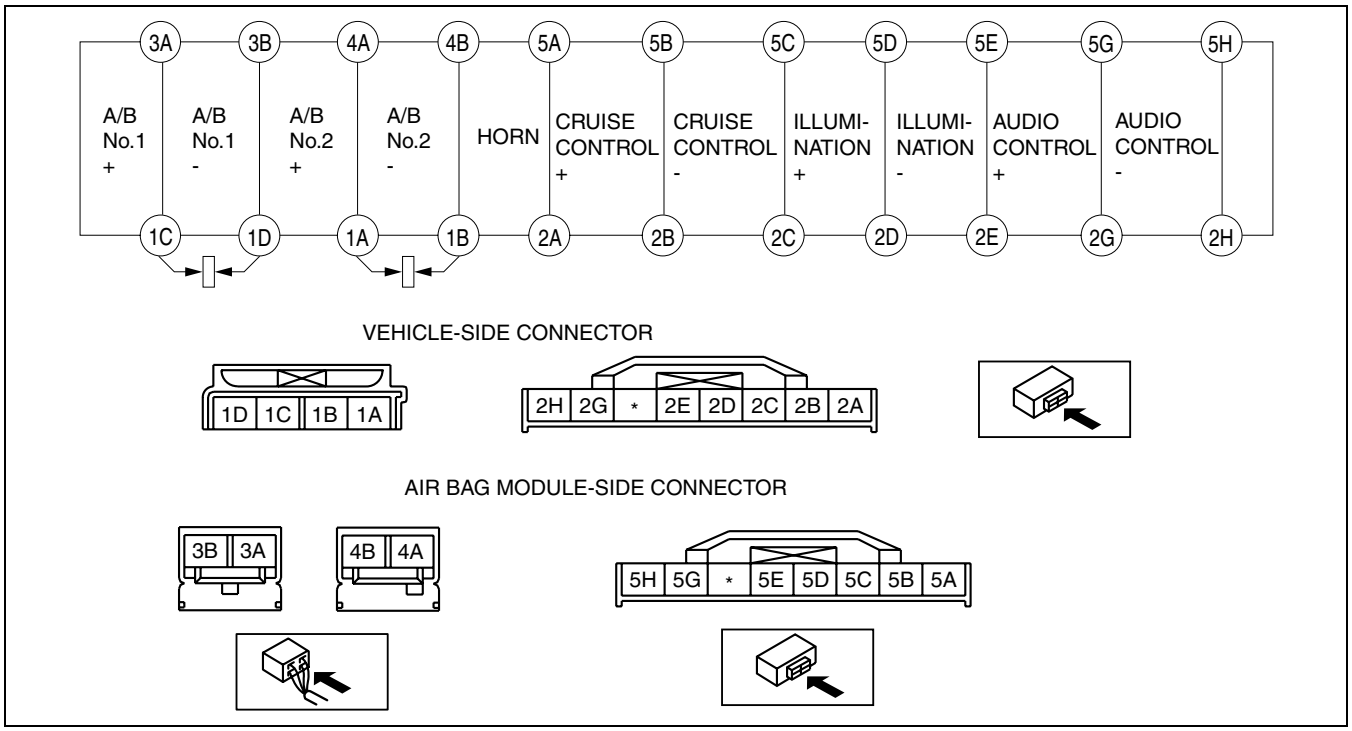


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## AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES

id081000801100

**Warning**

- **A live (undeployed) air bag module or pre-tensioner seat belt may accidentally operate (deploy) when it is disposed of and cause serious injury. Do not dispose of a live (undeployed) air bag module and pre-tensioner seat belt. If the SSTs (Deployment tool and Adapter harness) are not available, consult the nearest Mazda representative for assistance.**

**Caution**

- **Deploying the air bag modules and pre-tensioner seat belts inside the vehicle may cause damage to the vehicle interior. When the vehicle is not to be scrapped, always deploy the air bag modules and pre-tensioner seat belts outside the vehicle.**

- If the vehicle is to be scrapped, or when disposing of any air bag modules or pre-tensioner seat belts, operate (deploy) them inside the vehicle by following the deployment procedure below and using the **SST (Deployment tool)**.
- When disposing of an operated (deployed) air bag module and pre-tensioner seat belt, refer to “AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES”.

**Deployment Procedure for Inside of Vehicle**

1. Inspect the **SST (Deployment tool)**. (See 08-10-31 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Move the vehicle to an open space, away from strong winds, and close all of the vehicle doors and windows.
3. Turn the ignition switch to the LOCK position.
4. Disconnect the negative battery cable and wait for **1 min or more**.
5. Follow the procedure below for operating (deploying) the applicable air bag module or pre-tensioner seat belt.

**Driver-side Air Bag Module**

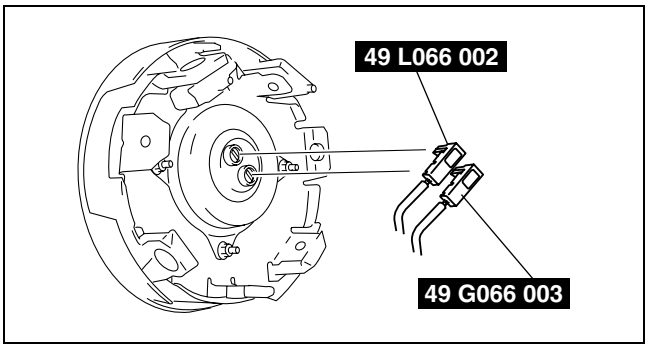
**Warning**

- **The driver-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both driver-side air bag module inflators simultaneously, following the procedure below.**

**Note**

- The **SSTs**, two types of adopter harnesses (for inflators No.1 and No.2) and two deployment tools are to be used to operate (deploy) the driver-side air bag module.

1. Remove the driver-side air bag module.
   (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Connect the **SSTs (Adapter harness)** to the driver-side air bag module as shown in the figure.
3. Install the driver-side air bag module.
   (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
4. Connect the **SSTs (Deployment tool)** to the **SSTs (Adapter harness)**.

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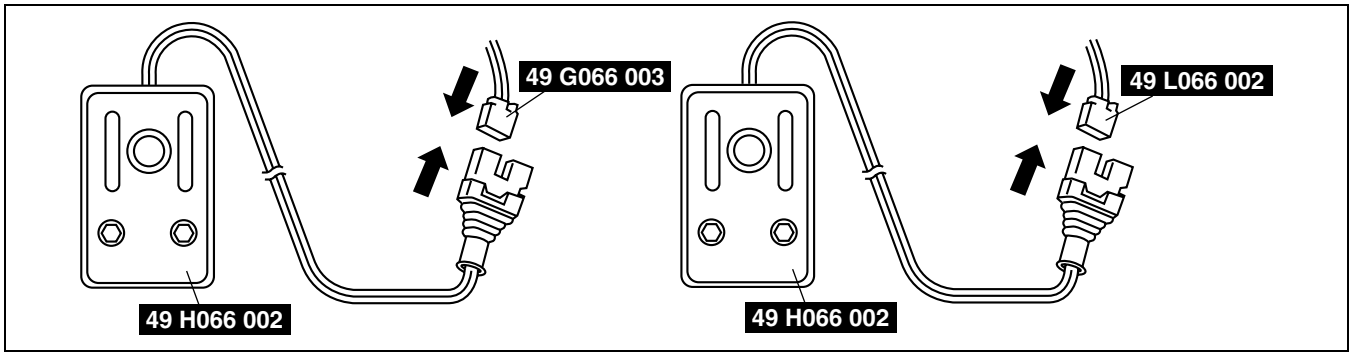


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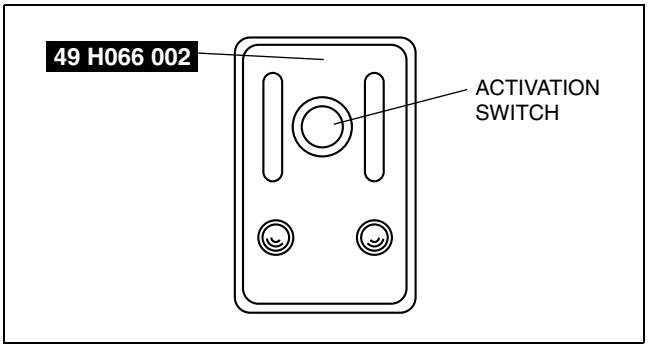
5. Connect both **SSTs (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on both **SSTs (Deployment tool)** is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.
8. Press the activation switch on the **SST (Deployment tool)** connected with **49 L066 002 (a yellow connector)** of the **SST (Adapter harness)**, and **after 3 s**, press the activation switch on the other **SST (Deployment tool)** to operate (deploy) the air bag module (both inflators).

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**Warning**

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can get burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SSTs (Deployment tool)** form the **SSTs (Adapter harness)**.

**Passenger-side Air Bag Module**

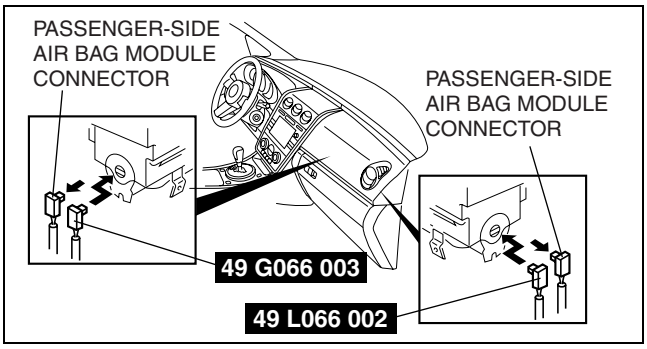
**Warning**

- **The passenger-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both passenger-side air bag module inflators simultaneously, following the procedure below.**

**Note**

- The **SSTs**, two types of adapter harnesses (for inflators No.1 and No.2) and two deployment tools are to be used to operate (deploy) the passenger-side air bag module.

1. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
2. Disconnect the passenger-side air bag module connector.
3. Connect the **SSTs (Adapter harness)** to the passenger-side air bag module as shown in the figure.

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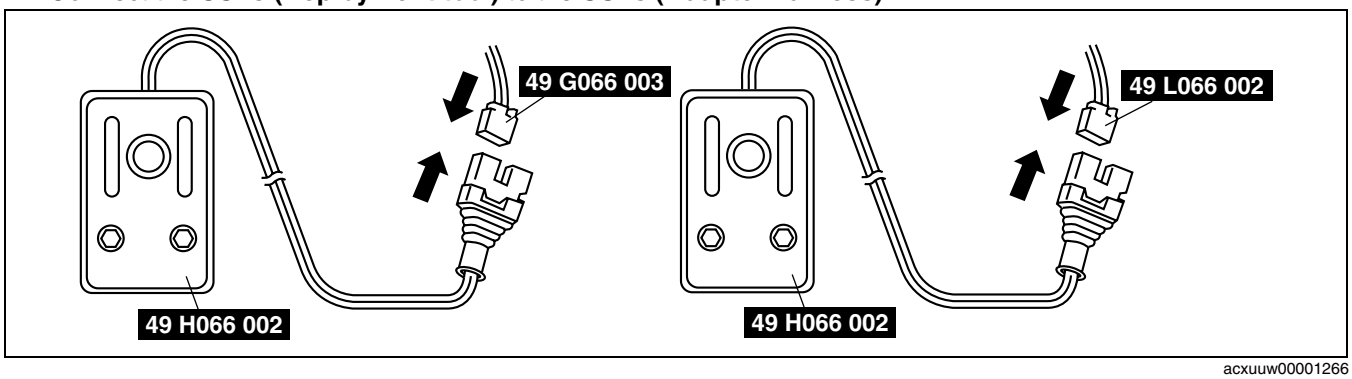
4. Connect the **SSTs (Deployment tool)** to the **SSTs (Adapter harness)**.

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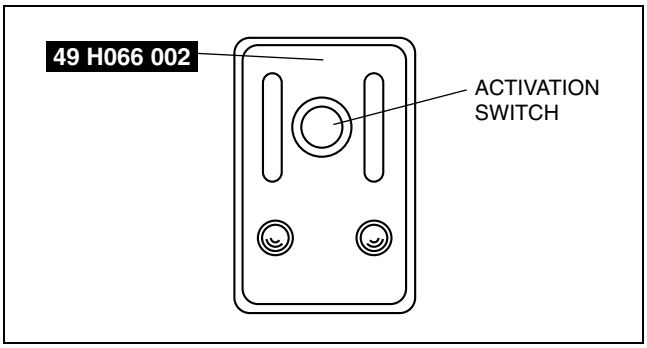
5. Connect both **SSTs (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on both **SSTs (Deployment tool)** is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.
8. Press the activation switch on the **SST (Deployment tool)** connected with **49 L066 002 (a yellow connector)** of the **SST (Adapter harness)**, and **after 3 s**, press the activation switch on the other **SST (Deployment tool)** to operate (deploy) the air bag module (both inflators).

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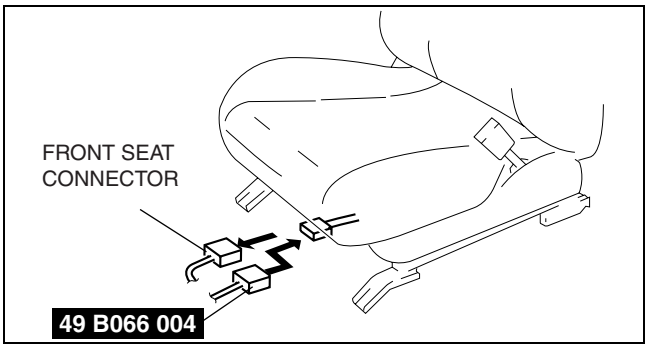
**Warning**

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

9. Disconnect the **SSTs (Deployment tool)** form the **SSTs (Adapter harness)**.

**Side Air Bag Module**

1. Disconnect the front seat connector.
2. Connect the **SST (Adapter harness)** to the side air bag module and pre-tensioner seat belt connector as shown in the figure.

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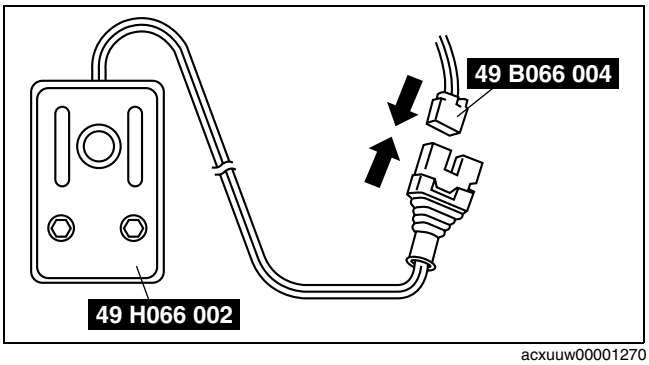
3. Connect the **SST (Deployment tool)** to the **SST (Adapter harness)**.
4. Connect the **SST (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
5. Verify that the red lamp on the **SST (Deployment tool)** is illuminated.
6. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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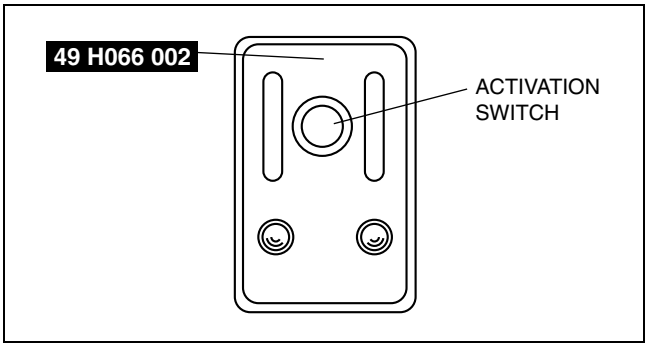
7. Press the activation switch on the **SST (Deployment tool)** to operate (deploy) the side air bag module.
8. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.

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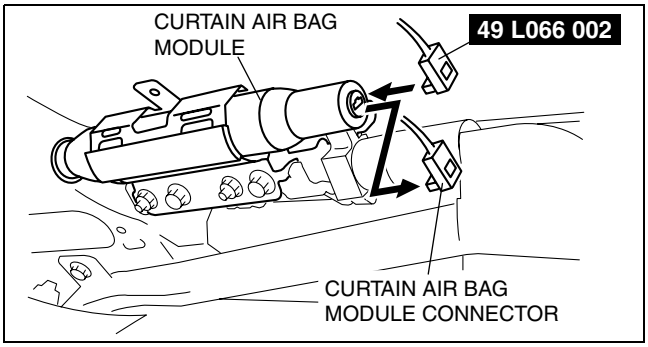
**Curtain Air Bag Module**

1. Remove the C-pillar trim.
   (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
2. Remove the D-pillar trim.
   (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Disconnect the curtain air bag module connector.
4. Connect the **SST (Adapter harness)** to the curtain air bag module as shown in the figure.

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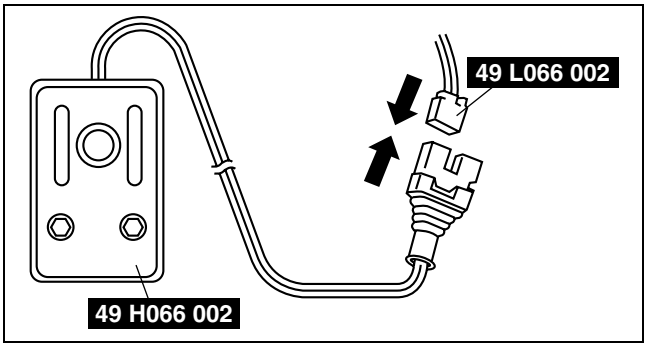
5. Connect the **SST (Deployment tool)** to the **SST (Adapter harness)**.
6. Connect the **SST (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
7. Verify that the red lamp on the **SST (Deployment tool)** is illuminated.
8. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.



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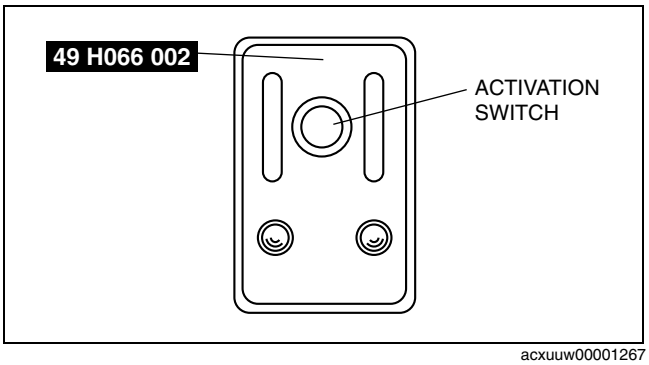
9. Press the activation switch on the **SST (Deployment tool)** to operate (deploy) the curtain air bag module.
10. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.



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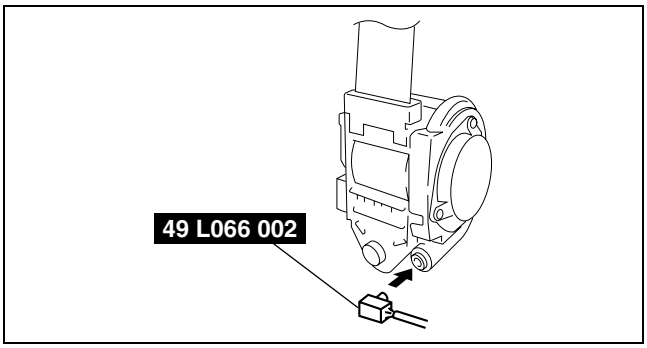
**Pre-tensioner Seat Belt**

1. Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
2. Remove the pre-tensioner seat belt and connect the **SST (Adapter harness)** as shown in the figure. (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
3. Install the pre-tensioner seat belt.



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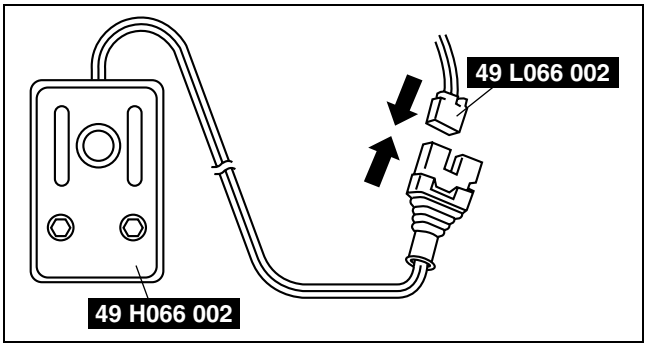
4. Connect the **SST (Deployment tool)** to the **SST (Adapter harness)**.
5. Connect the **SST (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
6. Verify that the red lamp on the **SST (Deployment tool)** is illuminated.
7. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.



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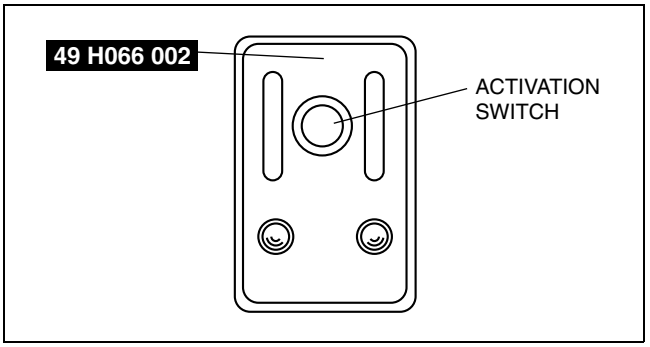
8. Press the activation switch on the **SST (Deployment tool)** to operate (deploy) the pre-tensioner seat belt.
9. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.



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**Deployment Procedure for Outside of Vehicle**

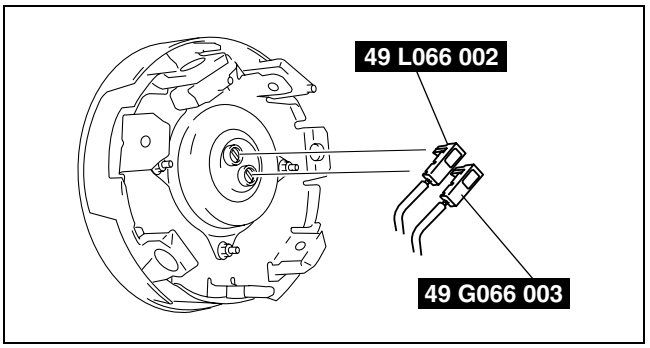
1. Inspect the **SST (Deployment tool)**.
   (See 08-10-31 INSPECTION OF SST (DEPLOYMENT TOOL).)
2. Turn the ignition switch to the LOCK position.
3. Disconnect the negative battery cable and wait for **1 min or more**.
4. Follow the procedure below for operating (deploying) the applicable air bag module or pre-tensioner seat belt.

**Driver-side Air Bag Module**

**Warning**

- **The driver-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both driver-side air bag module inflators simultaneously, following the procedure below.**

1. Remove the driver-side air bag module.
   (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Connect the **SSTs (Adapter harness)** to the driver-side air bag module as shown in the figure.



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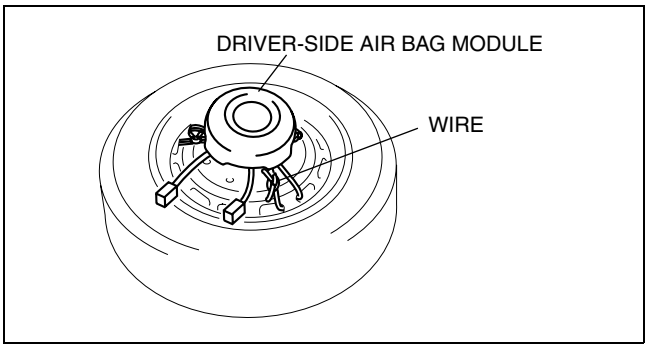
3. Place the driver-side air bag module on the center of the tire wheel with the padded surface facing up. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm$^2$ {0.002 in$^2$} or more**) through the wheel and the bolt installation holes of the air bag module **at least 4 times**.



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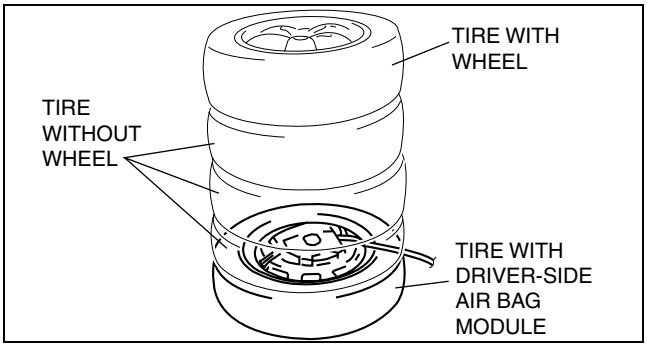
**Warning**

- **If the air bag module is not properly installed to the tire wheel, serious injury may occur when the module is operated (deployed). When installing the air bag module to the tire wheel, make sure the padded surface is facing up.**

4. Stack three tires without wheels on top of the tire with the driver-side air bag module, and then stack another tire with a wheel on the very top.



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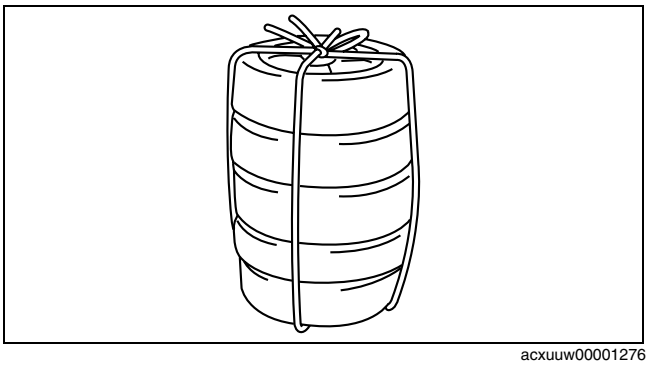
5. Secure the tires with wire.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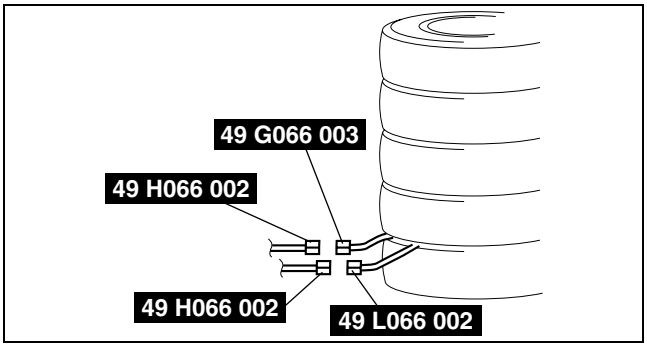
6. Connect the **SSTs (Deployment tool)** to the **SSTs (Adapter harness)**.
7. Connect both **SSTs (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on both **SSTs (Deployment tool)** is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.



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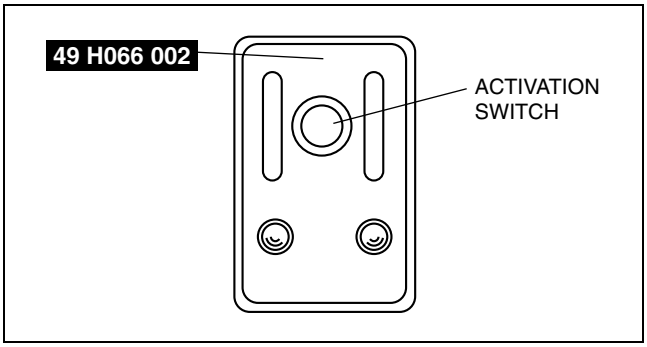
10. Press the activation switch on the **SST (Deployment tool)** connected with **49 L066 002 (a yellow connector)** of the **SST (Adapter harness)**, and **after 3 s**, press the activation switch on other **SST (Deployment tool)** to operate (deploy) the air bag module (both inflators).



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**Warning**

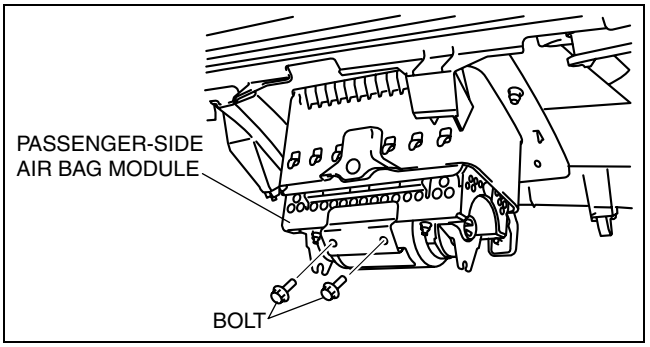
- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

11. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.

**Passenger-side Air Bag Module**

**Warning**
- **The passenger-side air bag module is a dual inflator type. If one inflator is forced to operate (deploy), the other may operate (deploy) accidentally. To prevent injury while disposing of the air bag module, make sure to operate (deploy) both passenger-side air bag module inflators simultaneously, following the procedure below.**

1. Remove the passenger-side air bag module.
   (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the bolts to the passenger-side air bag module.



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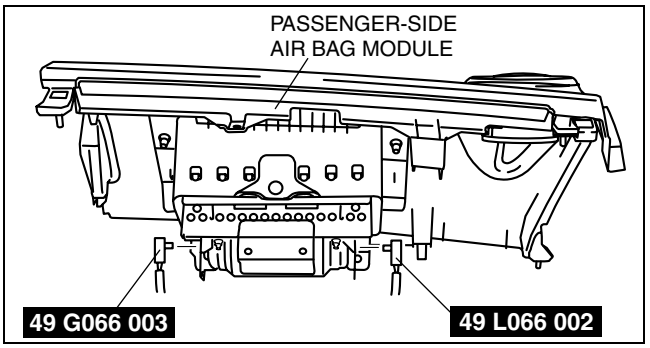
3. Connect the **SSTs (Adapter harness)** to the passenger-side air bag module as shown in the figure.



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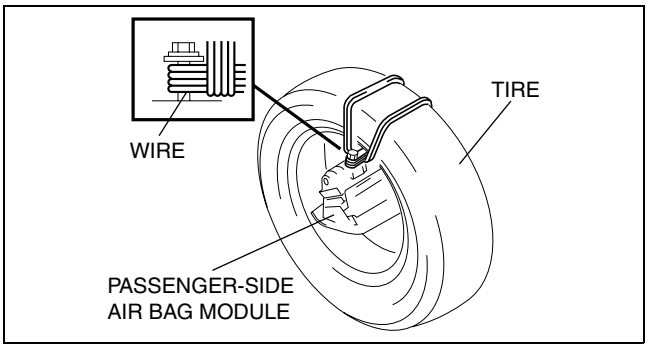
4. Place the padded surface of the passenger-side air bag module facing the center of the tire as shown in the figure. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm$^2$ {0.002 in$^2$} or more**) through the tire and around the bolts **at least 4 times** as shown in the figure.



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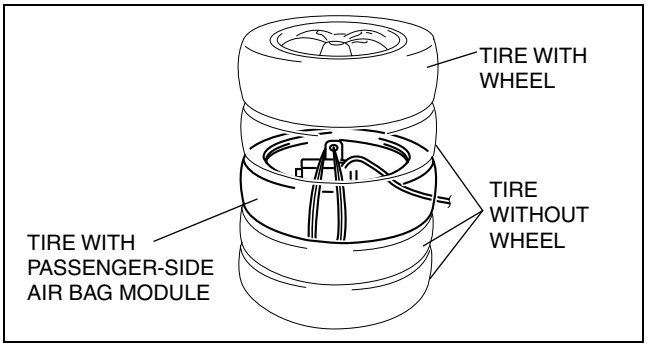
**Warning**
- **If the air bag module is not properly secured to the tire, the tires may fall over by the impact of operation (deployment) and cause serious injury. To prevent this, secure the air bag module properly with the padded surface facing the center of the tire.**

5. Stack the tire with the passenger-side air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the passenger-side air bag module, and then stack another tire with a wheel on the very top.



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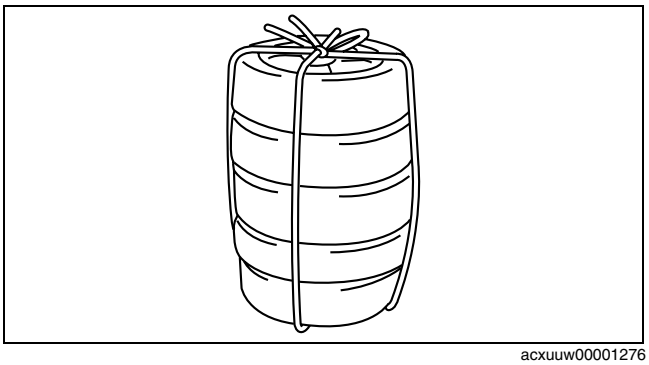
6. Secure the tires with wire.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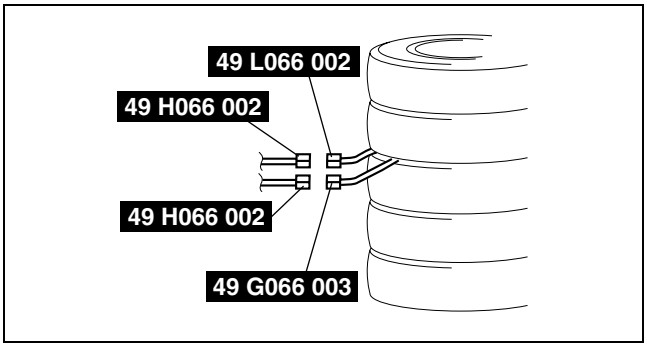
7. Connect the **SSTs (Deployment tool)** to the **SSTs (Adapter harness)**.
8. Connect both **SSTs (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
9. Verify that the red lamp on both **SSTs (Deployment tool)** is illuminated.
10. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.



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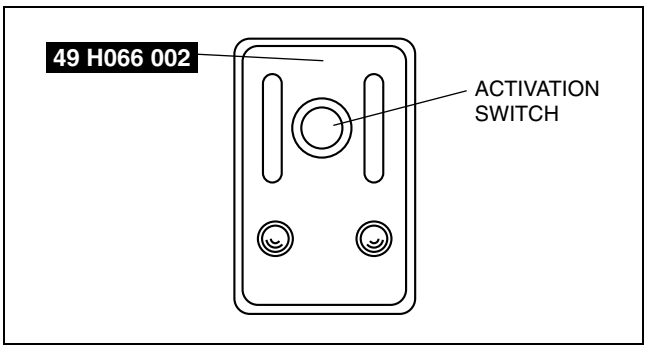
11. Press the activation switch on the **SST (Deployment tool)** connected with 46 L066 002 (a yellow connector) of the **SST (Adapter harness)**, and **after 3 s**, press the activation switch on the other **SST (Deployment tool)** to operate (deploy) the air bag module (both inflators).



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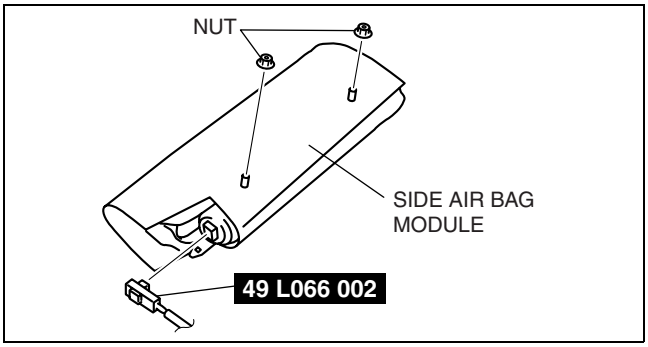
**Warning**

- **Verify that air bag module operation (explosive) sound occurs twice. If no operation (explosive) sound was heard or a single operation (explosive) sound was heard, both inflators would not have operated (deployed) properly. This may cause serious injury if the air bag module operates (deploy) unexpectedly. If the two operation (explosive) sounds are not heard, perform Step 8 again. If a total of two operation (explosive) sounds cannot be verified even though Step 8 is performed again, leave the air bag module alone for 30 min or more before approaching it again.**
- **The air bag module is very hot immediately after it is operated (deployed). You can be burned. Do not touch the air bag module for at least 15 min after deployment.**

12. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.

**Side Air Bag Module**

1. Remove the side air bag module.
   (See 08-10-8 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Install the nuts to the side air bag module as shown in the figure, and connect the **SST (Adapter harness)**.

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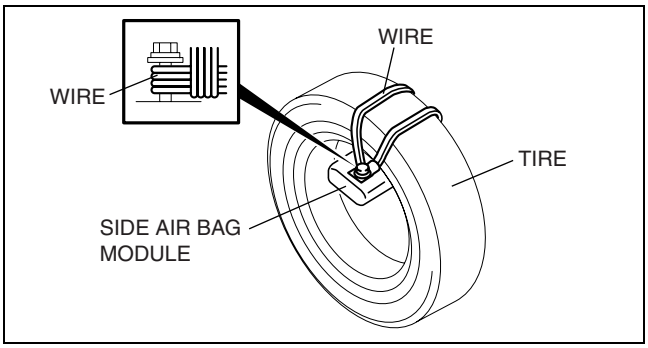
3. Place the padded surface of the side air bag module facing the center of the tire as shown in the figure. To secure the air bag module to the tire wheel, wrap a wire (cross section **1.25 mm$^2$ {0.002 in$^2$} or more**) through the tire and around the bolts **at least 4 times**.

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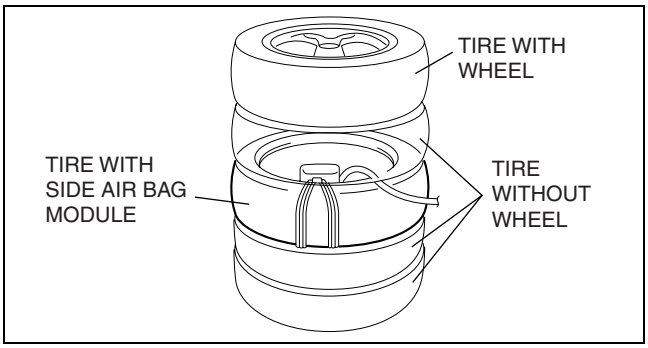
**Warning**

- **If the air bag module is not properly secured to the tire, the tires may fall over by the impact of operation (deployment) and cause serious injury. To prevent this, secure the air bag module properly with the padded surface facing the center of the tire.**

4. Stack the tire with the side air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the side air bag module, and then stack another tire with a wheel on the very top.

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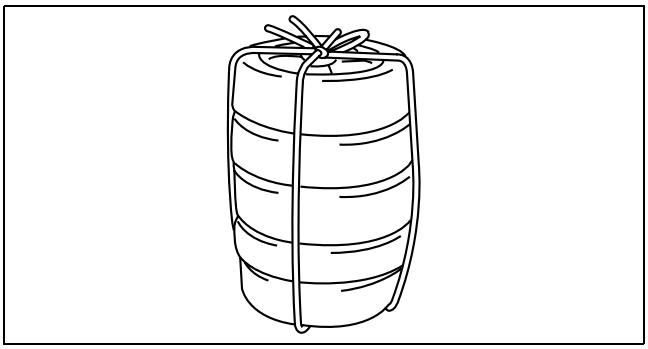
5. Secure the tires with wire.



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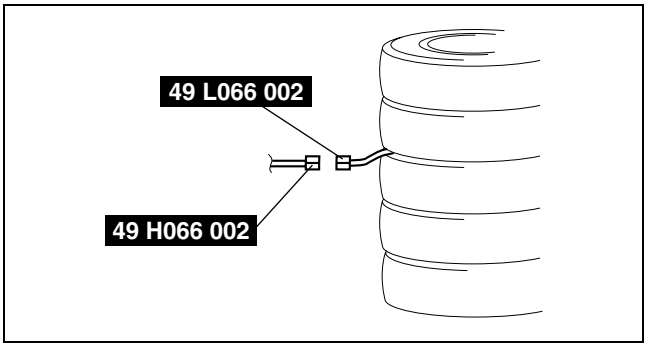
6. Connect the **SST (Deployment tool)** to the **SST (Adapter harness).**
7. Connect the **SST (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on the **SST (Deployment tool)** is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.



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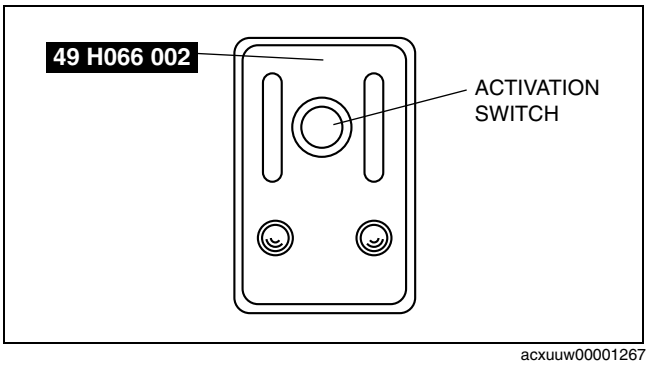
10. Press the activation switch on the **SST (Deployment tool)** to operate (deploy) the side air bag module.
11. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.



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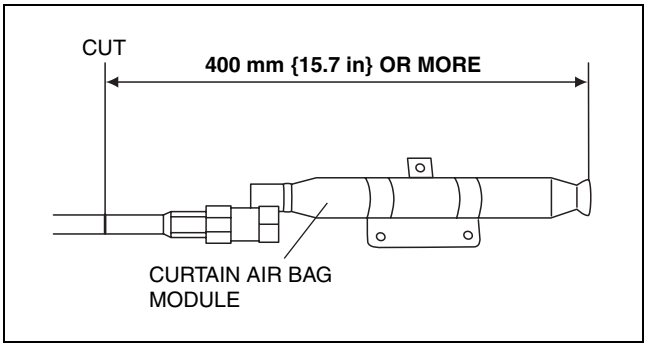
**Curtain Air Bag Module**

1. Remove the curtain air bag module.
   (See 08-10-8 CURTAIN AIR BAG MODULE REMOVAL/INSTALLATION.)
2. Secure the curtain air bag module in a vise, and cut off the deployment section, as shown in the figure.

   **Warning**
   - **Be sure not to crush the pipe on the side where it is cut. If it is crushed completely, the interior pressure of the pipe will build up and can cause it to explode during air bag module operation (deployment).**



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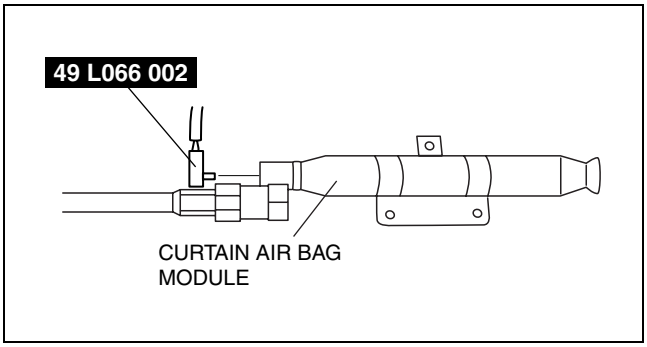
3. Connect the **SST (Adapter harness)** to the curtain air bag module as shown in the figure.



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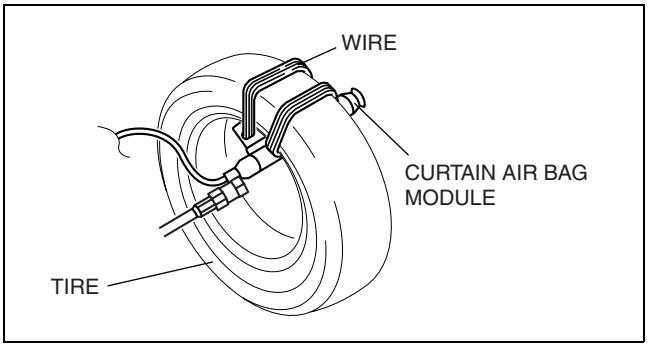
4. Secure the curtain air bag module to the tire, by wrapping a wire (cross section **1.25 mm$^2$ {0.002 in$^2$} or more**) through the tire and the bolt installation holes **at least 4 times** as shown in the figure.

   **Warning**
   - **If the air bag module is not properly installed to the tire, serious injury may occur when the module is operated (deployed). Make sure to install the air bag module securely.**



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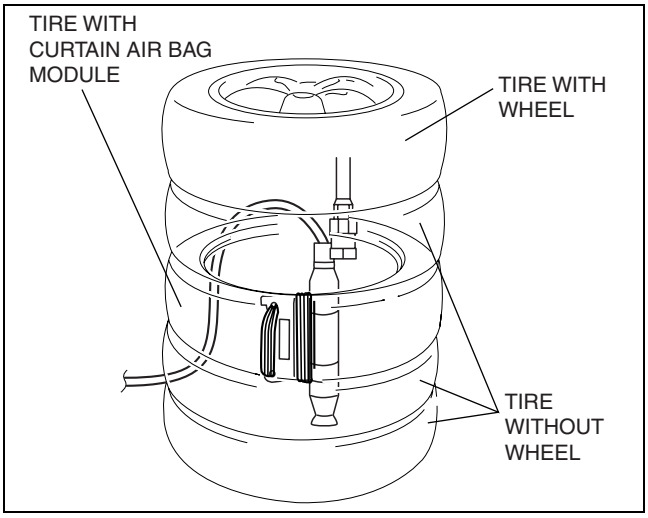
5. Stack the tire with the curtain air bag module on top of two tires without wheels. Stack a tire without a wheel on top of the tire with the curtain air bag module, and then stack another tire with a wheel on the very top.



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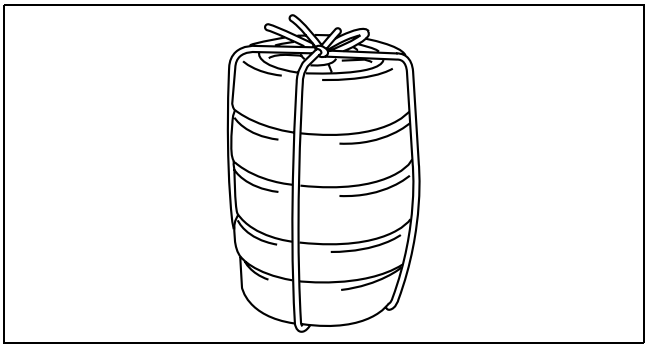
6. Secure the tires with wire.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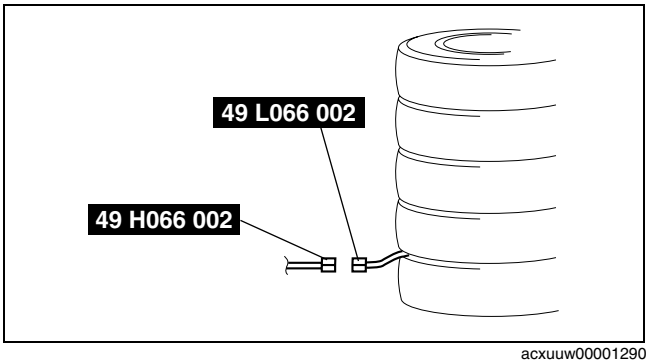
7. Connect the **SST (Deployment tool)** to the **SST (Adapter harness)**.
8. Connect the **SST (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
9. Verify that the red lamp on the **SST (Deployment tool)** is illuminated.
10. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.



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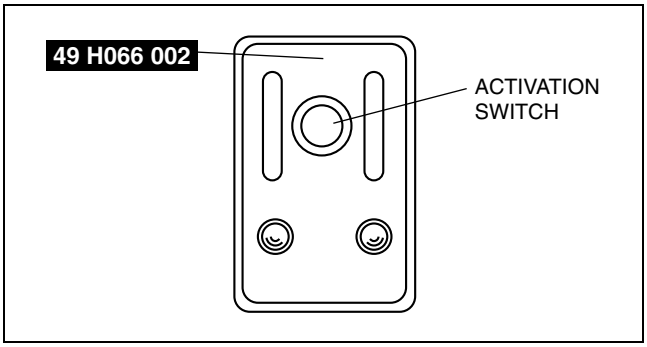
11. Press the activation switch on the **SST (Deployment tool)** to operate (deploy) the curtain air bag module.
12. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.



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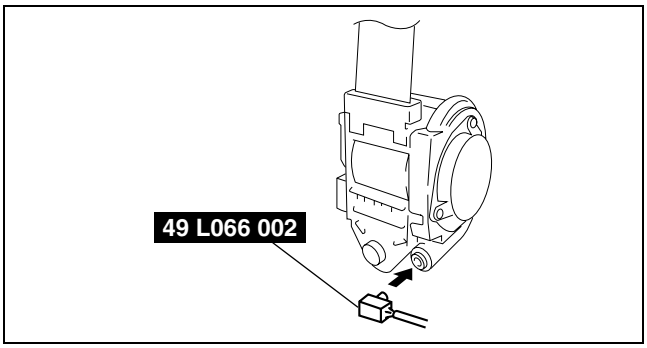
**Pre-tensioner Seat Belt**

1. Remove the pre-tensioner seat belt.
   (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
2. Connect the **SST (Adapter harness)** to the pre-tensioner seat belt as shown in the figure.



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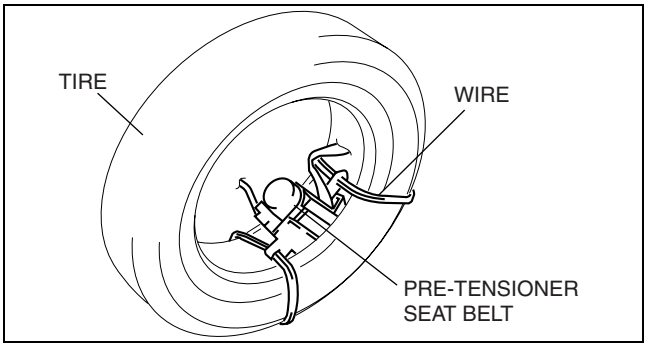
3. Put the pre-tensioner seat belt inside the tire and secure it to the tire by wrapping a wire (cross section of **1.25mm$^2$ {0.002in$^2$} or more**) through the tire and the bolt installation holes **at least 4 times**.

   **Warning**
   - **If the pre-tensioner seat belt is not properly installed to the tire, serious injury may occur when the pre-tensioner part is operated (deployed). When installing the pre-tensioner seat belt to the tire, make sure the pre-tensioner part is inside the tire.**



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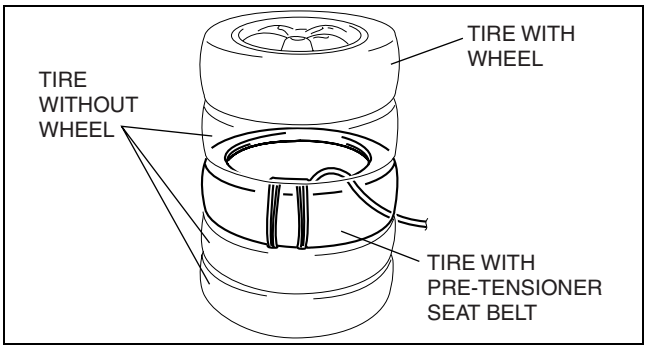
4. Stack the tire with the pre-tensioner seat belt on to of two tires without wheels. Stack a tire without a wheel on top of the tire with the pre-tensioner seat belt, and then stack another tire with a wheel on the very top.



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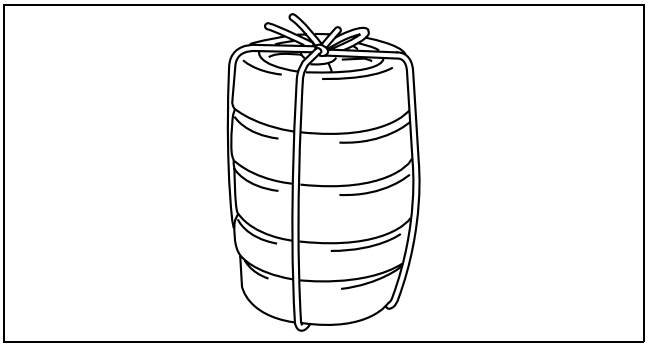
5. Secure the tires with wire.



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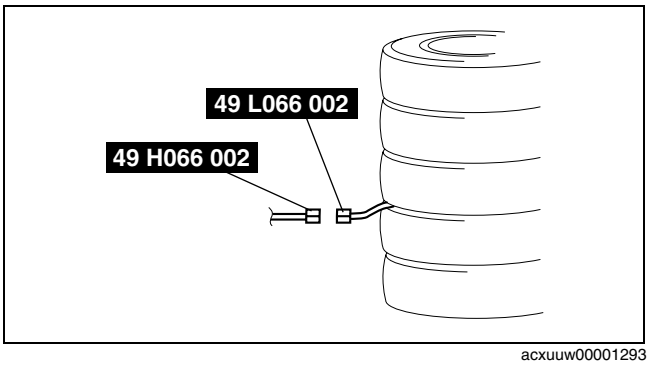
6. Connect the **SST (Deployment tool)** to the **SST (Adapter harness)**.
7. Connect the **SST (Deployment tool)** to the battery. Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal.
8. Verify that the red lamp on the **SST (Deployment tool)** is illuminated.
9. Verify that all persons are standing **at least 6 m {20 ft}** away from the vehicle.

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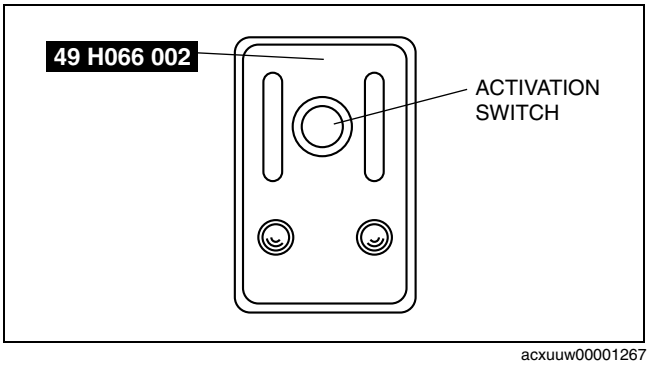
10. Press the activation switch on the **SST (Deployment tool)** to operate (deploy) the pre-tensioner seat belt.
11. Disconnect the **SSTs (Deployment tool)** from the **SSTs (Adapter harness)**.

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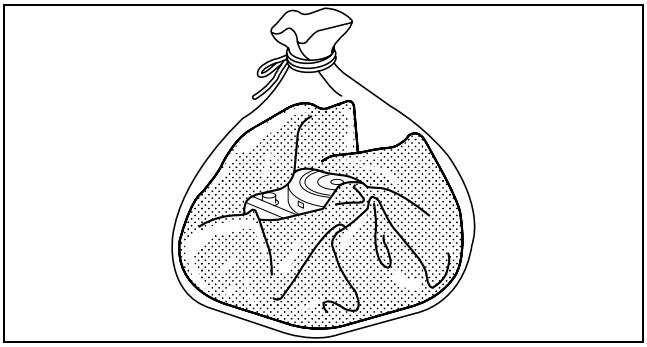
**AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DISPOSAL PROCEDURES**

id081000801200

**Warning**

- **A live (undeployed) air bag module or pre-tensioner seat belt may accidentally operate (deploy) when it is disposed of and cause serious injury. Always refer to the "AIR BAG MODULE AND PRE-TENSIONER SEAT BELT DEPLOYMENT PROCEDURES" and dispose of air bag modules and pre-tensioner seat belts in a deployed condition.**
- **The air bag modules and the pre-tensioner seat belts are very hot immediately after they are deployed. You can be burned. Do not touch an air bag module and pre-tensioner seat belt for at least 15 min after deployment.**
- **Pouring water on the deployed air bag module and pre-tensioner seat belt is dangerous. The water will mix with the residual gases to form a gas that can make breathing difficult. Do not pour water on the deployed air bag module and pre-tensioner seat belt.**
- **The deployed air bag module or pre-tensioner seat belt may contain deposits of sodium hydroxide, a caustic byproduct of the gas-generated combustion. If this substance gets into your eyes or on your hands, it can cause irritation and itching. When handling the deployed air bag module and pre-tensioner seat belt, wear gloves and safety glasses.**
- **Due to the adoption of 2-step deployment control in both the driver and passenger-side air bag modules, depending on the impact force, it is possible that inflator No.2 might not operate (deploy). Before disposing of the air bag module, always follow the inflator deployment procedures and verify the complete operation (deployment) of inflators No.1 and 2.**

1. Remove the deployed air bag module or pre-tensioner seat belt.
2. Put the air bag module or pre-tensioner seat belt in a plastic bag, seal the bag, and then dispose of it.



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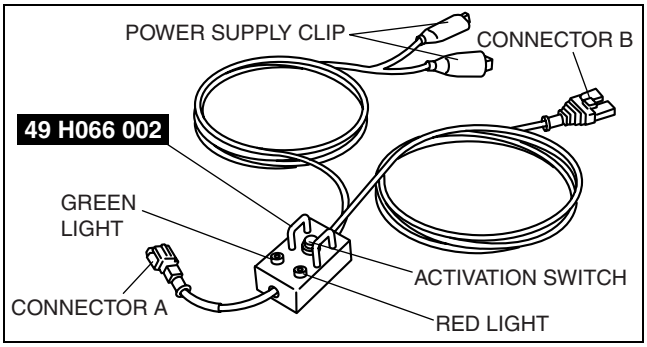
**INSPECTION OF SST (DEPLOYMENT TOOL)**

id081000801000

1. Before using the **SST (49 H066 002), inspect its operation.**

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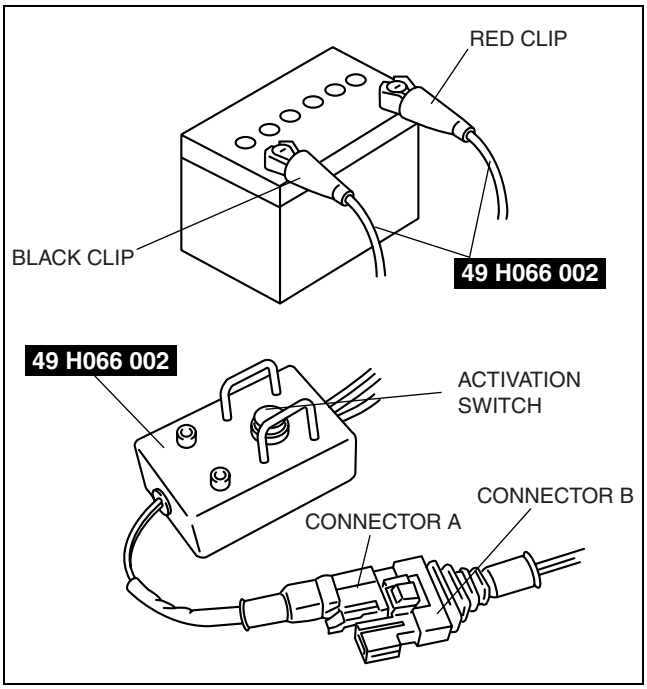
**Inspection Procedure**

1. Follow the steps below to inspect the **SST (49 H066 002).**
   - If not as indicated in the table, replace the **SST (49 H066 002) because it has a malfunction.**

   **Warning**
   - **Do not use a malfunctioning SST (49 H066 002), otherwise it could cause the air bag module or pre-tensioner seat belt to accidentally operate (deploy).**

   **Caution**
   - **Because the permissible voltage for the SST (49 H066 002) is 12 V, do not connect a 24 V power source because it will damage the SST. Always connect only a 12 V power source.**

| Step | Inspection procedure | Light condition | |
|---|---|---|---|
| | | Green | Red |
| 1 | Connect the power supply red clip to the positive battery terminal, and the black clip to the negative battery terminal. | On | Off |
| 2 | Connect connectors A and B. | Off | On |
| 3 | Press the activation switch. | On | Off |

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# 08-11 SEAT BELT

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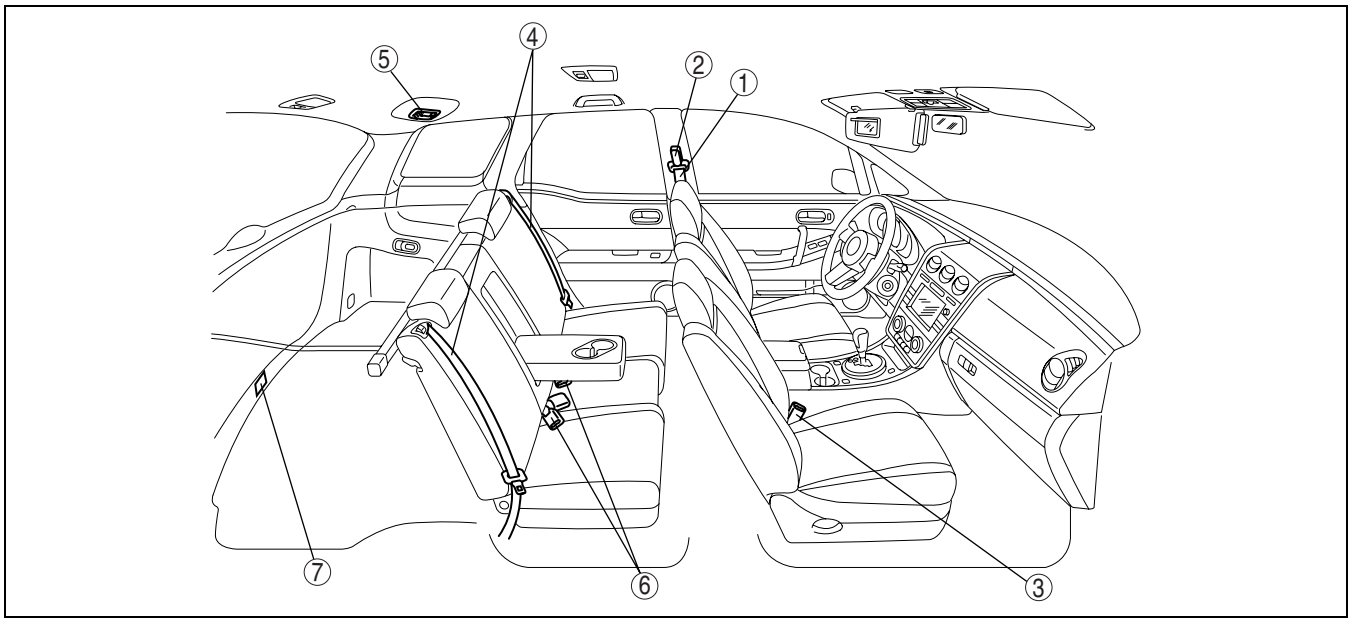


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| | |
|---|---|
| 1 | Front seat belt<br>(See 08-11-2 FRONT SEAT BELT REMOVAL/ INSTALLATION.)<br>(See 08-11-4 SEAT BELT INSPECTION.) |
| 2 | Adjuster anchor<br>(See 08-11-3 ADJUSTER ANCHOR REMOVAL/ INSTALLATION.) |
| 3 | Front buckle<br>(See 08-11-5 FRONT BUCKLE REMOVAL/ INSTALLATION.)<br>(See 08-11-6 BUCKLE SWITCH INSPECTION.) |

| | |
|---|---|
| 4 | Rear seat belt<br>(See 08-11-3 REAR SEAT BELT REMOVAL/ INSTALLATION.)<br>(See 08-11-4 SEAT BELT INSPECTION.) |
| 5 | Rear center seat belt<br>(See 08-11-4 REAR CENTER SEAT BELT REMOVAL/INSTALLATION.)<br>(See 08-11-4 SEAT BELT INSPECTION.) |
| 6 | Rear buckle<br>(See 08-11-6 REAR BUCKLE REMOVAL/ INSTALLATION.) |
| 7 | Child-restraint seat anchor<br>(See 08-11-6 CHILD-RESTRAINT SEAT ANCHOR REMOVAL/INSTALLATION.) |

## FRONT SEAT BELT REMOVAL/INSTALLATION

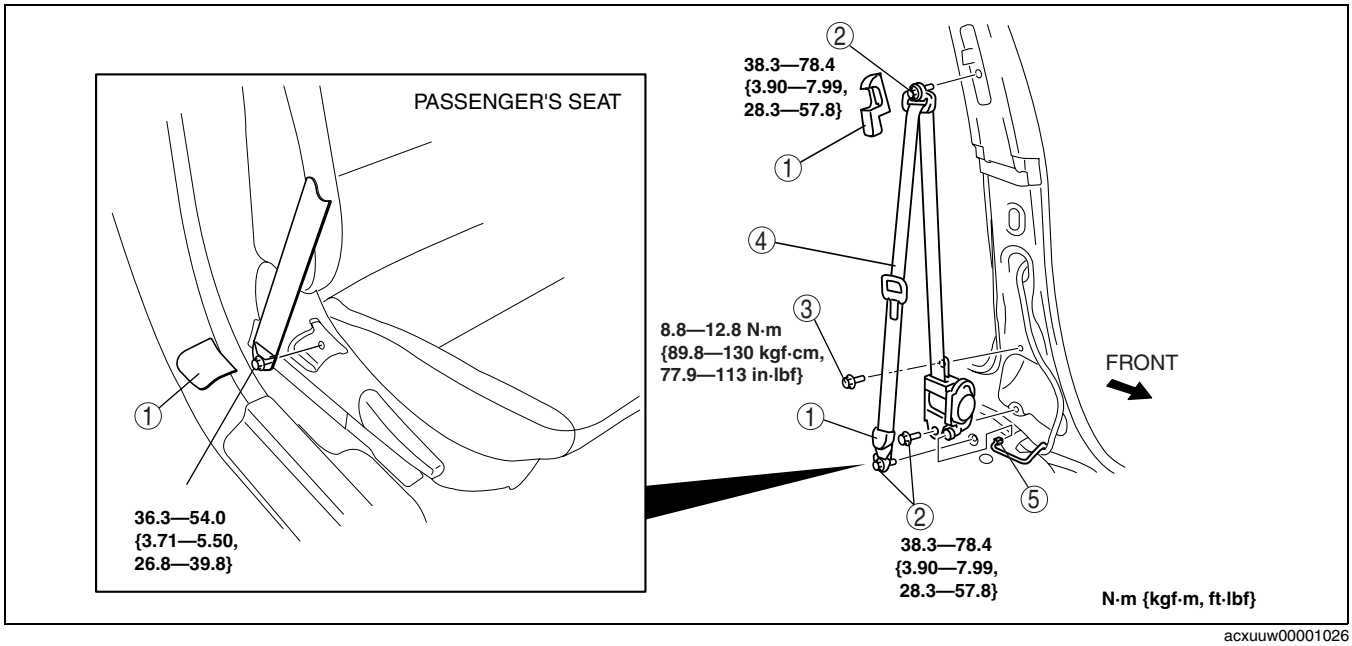
id081100800600

**Warning**
- **Handling the front seat belt (pre-tensioner seat belt) improperly can accidentally deploy the pre-tensioner seat belt, which may seriously injure you. Read the air bag system service warnings and cautions before handling the front seat belt. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

**Warning**
- **The side air bag sensor is attached to the lower part of the B-pillar. When working around the B-pillar, disconnect the negative battery cable avoiding excessive impact to the lower part of the B-pillar.**

**Caution**
- **The ELR (emergency locking retractor) has a spring that will unwind if the retractor cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **1min or more**.
3. Remove the front scuff plate inner. (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
4. Remove the rear scuff plate inner. (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
5. Remove the B-pillar lower trim. (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

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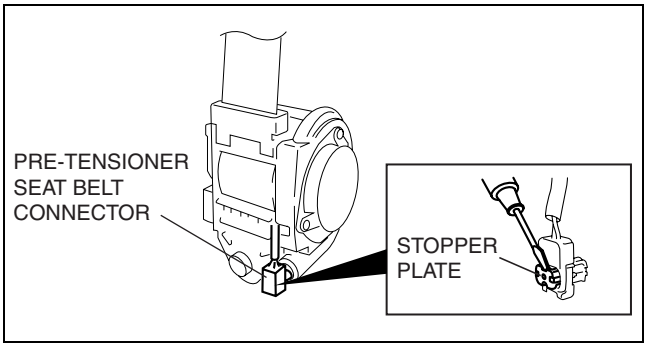
| | |
|---|---|
| 1 | Cover |
| 2 | Bolt A |
| 3 | Bolt B |

| | |
|---|---|
| 4 | Front seat belt |
| 5 | Connector<br>(See 08-11-3 Connector Removal Note.) |

7. Install in the reverse order of removal.
8. Turn the ignition switch to the ON position.
9. Verify that the air bag system warning light illuminates for **approx. 6 s** and goes out.
   - If the air bag system warning light dose not operate, refer to the on-board diagnostic system (air bag system) and perform inspection of the system.

**Connector Removal Note**

1. Using a flathead screwdriver, pry out the connector stopper plate.
2. Disconnect the connector.

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## ADJUSTER ANCHOR REMOVAL/INSTALLATION

id081100802000

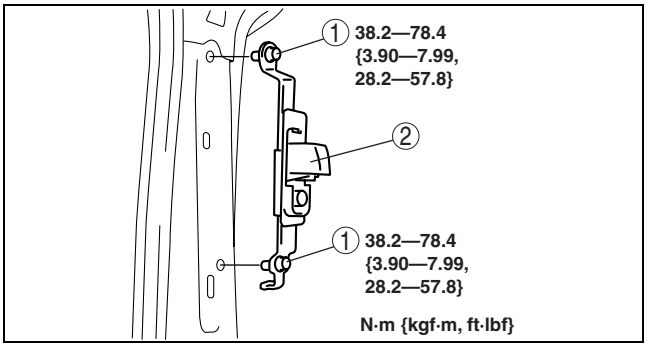
**Warning**

- **The side air bag sensor is attached to the lower part of the B-pillar. When working around the B-pillar, disconnect the negative battery cable or work carefully, avoiding excessive impact to the lower part of the B-pillar.**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable.
3. Remove the following parts:
   (1) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (2) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (3) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (5) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Adjuster anchor |

5. Install in the reverse order of removal.

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## REAR SEAT BELT REMOVAL/INSTALLATION

id081100800800

**Note**

- Rear seat belts are built into the rear seat back. See rear seat disassembly/assembly to removal/installation the rear seat belt. (See 09-13-8 REAR SEAT DISASSEMBLY/ASSEMBLY.)

## REAR CENTER SEAT BELT REMOVAL/INSTALLATION

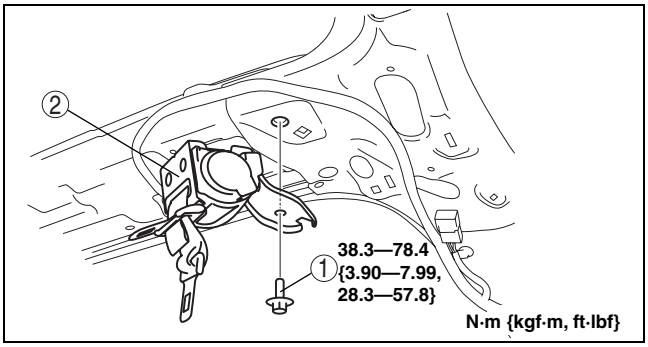
id081100800900

**Caution**
- **The ELR (emergency locking retractor) has a spring that will unwind if the retractor cover is removed. The spring cannot be rewound by hand. If this occurs, the ELR will not work properly. Therefore, do not disassemble the retractor.**

1. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17)Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Rear center seat belt |

3. Install in the reverse order of removal.

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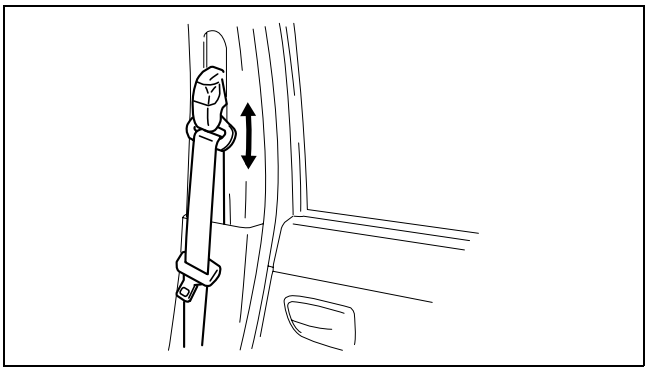
## SEAT BELT INSPECTION

id081100800300

**Belt**
1. Verify that the belt is installed properly with no twists or kinks.
2. Verify that there is no damage to the seat belt and no deformation of the metal fittings.
   - If there is any malfunction, replace the seat belt.

**ELR**
1. Verify that the belt can be pulled out smoothly, and that it retracts smoothly.
   - If there is any malfunction, replace the seat belt.
2. Verify that the retractor locks when the belt is pulled quickly.
   - If there is any malfunction, replace the seat belt.
3. Remove the retractor.



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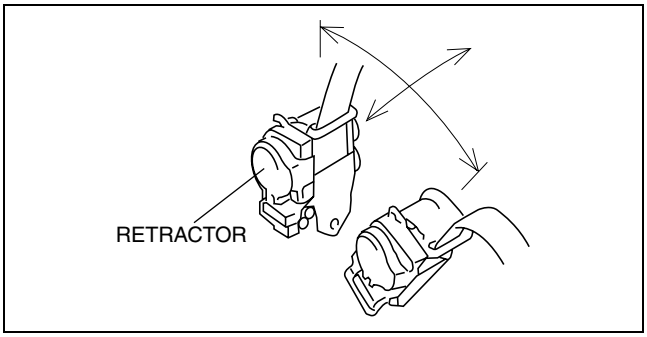
4. While pulling the seat belt out, make sure that the seat belt does not lock when the retractor is tilted slowly up to **15**° from the mounted position and locks when the retractor is tilted **40**° **or more.**
   - If there is any malfunction, replace the seat belt.

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**ALR**

1. Pull the belt out fully to change the lock mode from ELR to ALR.
2. Verify that retractor makes a clicking sound as the belt slowly retracts. If no sound is heard, the lock mode has not changed to ALR. If necessary, repeat Step 1.
   - If there is any malfunction, replace the seat belt.
3. Verify that the retractor locks when pulled.
   - If there is any malfunction, replace the seat belt.
4. Verify that the lock mode changes to ELR when the belt is fully pulled out.
   - If there is any malfunction, replace the seat belt.

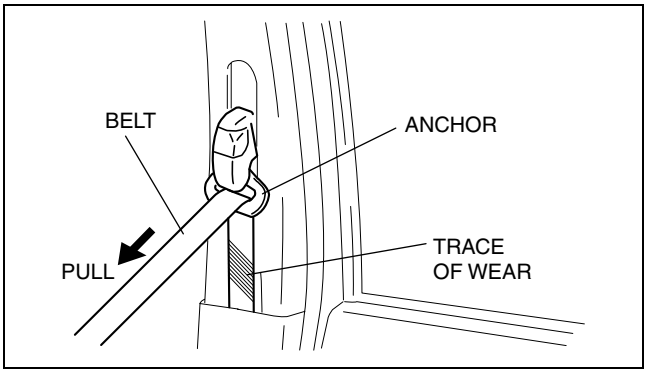
**Load Limiter Retractor**



**Warning**

- **When the load limiter operates, the belt and anchor rub against each other strongly leaving wear tracks. If the seat belt is used in this state, the seat belt will not function at its full capability and there is the possibility of serious injury to passengers. Be sure to replace the seat belt once the load limiter operates.**

1. If the vehicle has been subjected to a shock in an accident, pull the belt from the retractor and confirm that there are no wear tracks (the load limiter has not operated) by visually inspecting and feeling the belt.
   - If there is any malfunction, replace the seat belt.

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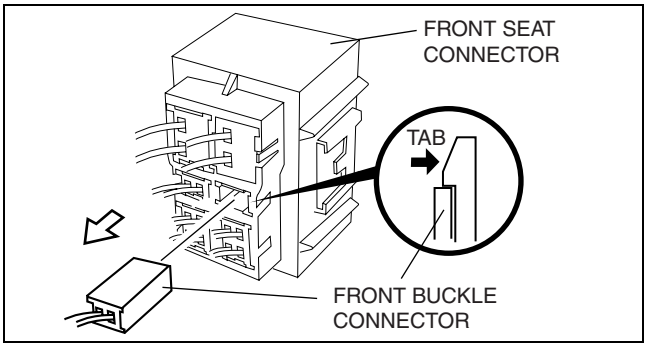
**FRONT BUCKLE REMOVAL/INSTALLATION**

id081100800400

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable.
3. Remove the front seat. (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
4. Detach the tab as shown in the figure and remove the connector from the front seat connector.

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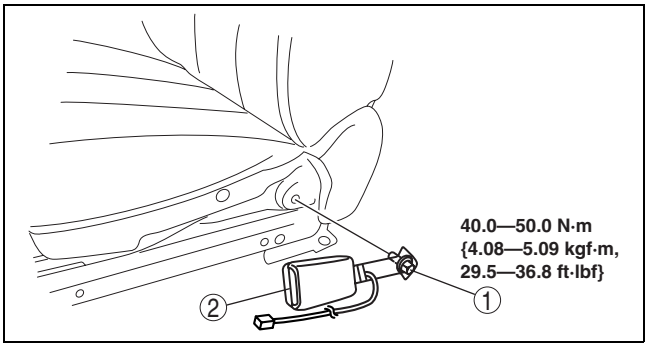
5. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Front buckle |

6. Install in the reverse order of removal.

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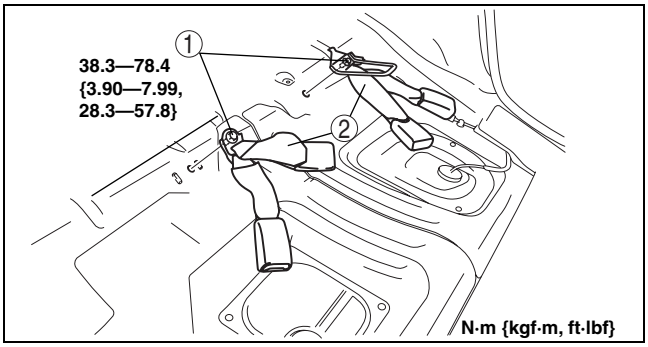
### REAR BUCKLE REMOVAL/INSTALLATION

id081100800700

1. Remove the rear seat cushion. (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Rear buckle |

3. Install in the reverse order of removal.

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### BUCKLE SWITCH INSPECTION

id081100803000

1. Inspect for continuity between the buckle switch terminals using a tester.
   - If not as indicated in the table, replace the front buckle.

○—○ : Continuity

| Seat belt | Terminal | |
|---|---|---|
| | A | B |
| Fastened | | |
| Unfastened | ○ | ○ |

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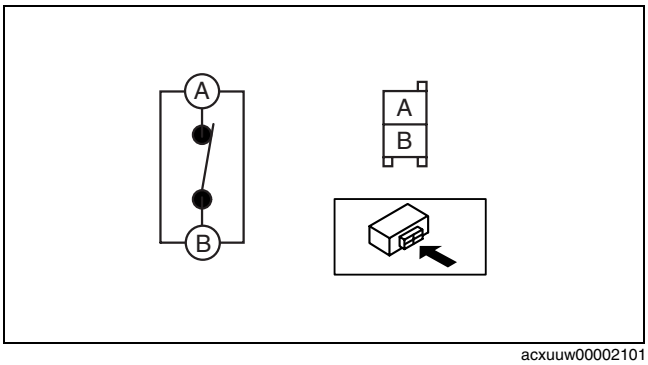


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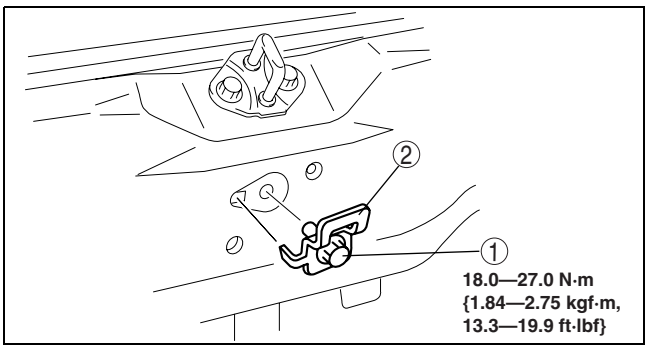
### CHILD-RESTRAINT SEAT ANCHOR REMOVAL/INSTALLATION

id081100800100

1. Remove the trunk end trim bezel.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Child-restraint seat anchor |

3. Install in the reverse order of removal.

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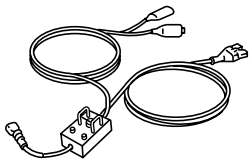
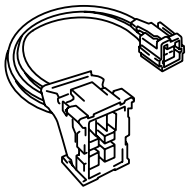
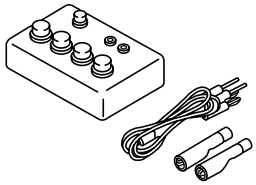
# 08-60 SERVICE TOOLS

**RESTRAINTS SST . . . . . 08-60–1**

## RESTRAINTS SST

id086000800100

| | | |
|---|---|---|
| 49 H066 002<br>Deployment tool<br>  | 49 B066 004<br>Adapter harness<br>  | 49 L066 002<br>Adapter harness<br> |
| 49 G066 003<br>Adapter harness<br> | 49 N088 0A0<br>Fuel and Thermometer checker<br>  | - |

# BODY & ACCESSORIES

**09**
SECTION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ON-BOARD DIAGNOSTIC[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C
ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM]. . . . . 09-02D
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## 09-02A ON-BOARD DIAGNOSTIC [ADVANCED KEYLESS SYSTEM]


DTC INSPECTION[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–2
PID/Data Monitor and Record Procedure . . . . . 09-02A–2

DTC TABLE[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–3
PID/DATA MONITOR TABLE[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–4
DTC B1342[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–4
DTC B2477[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–5
DTC B1317/B1318[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–5
DTC B2170[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–6
DTC B1126[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–6
DTC U0236[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–7
DTC B1093[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–7
DTC U0214[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–8
DTC B1133[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–8
DTC B1132[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–9
DTC B1128[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–9
DTC B1131[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–10
DTC B1129[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–10
DTC B112A[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–11
DTC B1134[ADVANCED KEYLESS SYSTEM] . . . . . 09-02A–11

## DTC INSPECTION[ADVANCED KEYLESS SYSTEM]

1. Connect the M-MDS to the DLC-2.
2. Verify if any DTCs are displayed.
   - If any DTCs are displayed, carry out troubleshooting according to the corresponding DTC inspection.
3. Disconnect the M-MDS.

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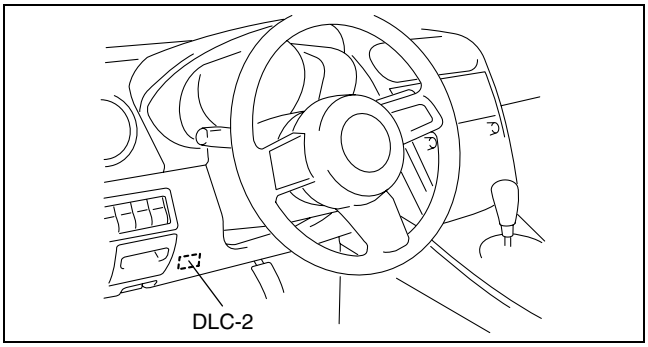


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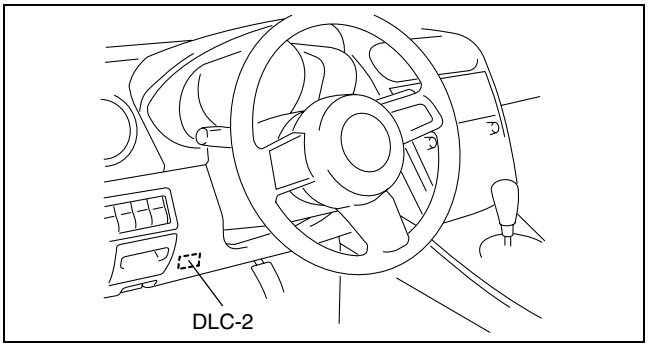
### PID/Data Monitor and Record Procedure

1. Connect the M-MDS to the DLC-2.
2. Access and monitor PIDs using the M-MDS.

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## DTC TABLE[ADVANCED KEYLESS SYSTEM]

id0902e1801900

| DTC<br>M-MDS display | description | Page |
|---|---|---|
| B1342 | Keyless control module internal malfunction | 09-02A-4 DTC B1342[ADVANCED KEYLESS SYSTEM] |
| B1134 | Unprogrammed card key | 09-02A-11 DTC B1134[ADVANCED KEYLESS SYSTEM] |
| B2477 | Configuration error | 09-02A-5 DTC B2477[ADVANCED KEYLESS SYSTEM] |
| B1317 | Keyless control module power supply voltage increases. | 09-02A-5 DTC B1317/ B1318[ADVANCED KEYLESS SYSTEM] |
| B1318 | Keyless control module power supply voltage decreases | |
| B2170 | Push switch (Steering lock unit) | 09-02A-6 DTC B2170[ADVANCED KEYLESS SYSTEM] |
| B1126 | Steering lock unit internal malfunction | 09-02A-6 DTC B1126[ADVANCED KEYLESS SYSTEM] |
| U0236 | Steering lock unit communication system | 09-02A-7 DTC U0236[ADVANCED KEYLESS SYSTEM] |
| B1093 | Steering lock unit communication error | 09-02A-7 DTC B1093[ADVANCED KEYLESS SYSTEM] |
| U0214 | Keyless receiver | 09-02A-8 DTC U0214[ADVANCED KEYLESS SYSTEM] |
| B1133 | Keyless antenna (exterior, RF) | 09-02A-8 DTC B1133[ADVANCED KEYLESS SYSTEM] |
| B1132 | Keyless antenna (exterior, LF) | 09-02A-9 DTC B1132[ADVANCED KEYLESS SYSTEM] |
| B1128 | Keyless antenna (Interior, rear) | 09-02A-9 DTC B1128[ADVANCED KEYLESS SYSTEM] |
| B1131 | Keyless antenna (exterior, rear) | 09-02A-10 DTC B1131[ADVANCED KEYLESS SYSTEM] |
| B1129 | Keyless antenna (Interior, middle) | 09-02A-10 DTC B1129[ADVANCED KEYLESS SYSTEM] |
| B112A | Keyless antenna (Interior, front) | 09-02A-11 DTC B112A[ADVANCED KEYLESS SYSTEM] |
| U0323 | Communication error to instrument cluster | 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM] |
| U0100 | Communication error to PCM | |
| U0073 | Control module communication error | |
| U2023 | Error signal from CAN related module | |

## PID/DATA MONITOR TABLE[ADVANCED KEYLESS SYSTEM]

id0902e1802000

### PID/data monitor table

| PID name (definition) | Data contents | Unit/ Operation | Terminal |
|---|---|---|---|
| DTC_CNT | Number of continuous DTCs | – | – |
| RPM | Engine speed | RPM | 2E, 2F |
| VSS | Vehicle speed | KPH | 2E, 2F |
| VPWR | Supply voltage | V | 2A |
| NUMCARD | Number of programmed card keys | – | – |
| NUMKEY* | Number of programmed key ID numbers | – | – |
| DRSW_D | Door switch (driver's door) | CLOSE/ OPEN | 3Q |
| DRSW_ALL | Door switch (except driver's door) | CLOSE/ OPEN | 3Q |
| REQ_SW_P | Request switch (right side door) | On/Off | 3I |
| REQ_SW_D | Request switch (left side door) | On/Off | 3K |
| REQ_SW_BK | Request switch (liftgate) | On/Off | 3M |
| LOCK_SW_D | Door lock-link switch (driver's side) | On/Off | 3N |
| IMMOBI | Immobilizer system equipped or not | On*/Off | – |
| TR/LG_SW | Trunk compartment light switch | CLOSE/ OPEN | |
| IG_KEY_IN | Key reminder switch | Key-In/Key-Out | 3F |
| IG_SW_ST | Ignition switch (Push switch) | Pushed/Not Pushed | 3E |
| BUZZER | Keyless beeper | On/Off | 2K |
| PWR_IG1 | Power supply (IG1) | On/Off | 2C |
| PWR_ACC | Power supply (ACC) | On/Off | 2E |

* : Vehicles with immobilizer system

### Active command mode table

| Command name | Output part name | Unit/ Operation | Terminal |
|---|---|---|---|
| BZR_OUT | Keyless beeper | On/Off | 2K |
| BZR_INN | Interior buzzer (Instrument cluster) | On/Off | 2E, 2F |
| LNP_RED | Keyless warning light (red) | On/Off | 2E, 2F |
| LNP_GREEN | Keyless indicator light (green) | On/Off | 2E, 2F |
| DR_LOCK | All doors lock | Off/Lock | 3Q |
| DR_UNLOCK | All doors unlock | Off/Unlock | 3Q |

## DTC B1342[ADVANCED KEYLESS SYSTEM]

id0902e1802100

| DTC B1342 | Keyless control module internal maifunction. |
|---|---|
| POSSIBLE CAUSE | • Malfunction in the keyless control module internal circuit |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1342 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B2477[ADVANCED KEYLESS SYSTEM]

id0902e1802300

| | |
|---|---|
| **DTC B2477** | **Configuration error.** |
| **POSSIBLE CAUSE** | • **Keyless control module configuration has not been performed correctly** |
| **POSSIBLE CAUSE** | • Keyless control module configuration error.<br>• Malfunction in the keyless control module internal circuit |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **PERFORM INSTRUMENT KEYLESS CONTROL MODULE CONFIGURATION**<br>• Perform keyless control module configuration.<br>• Is the DTC displayed?<br>— M-MDS: B2477 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING OF DTC B2477 COMPLETED**<br>• Clear the DTC from the memory.<br>• Is any DTC displayed? | Yes | Go to the applicable DTC inspection. |
| | | No | DTC troubleshooting completed. |

## DTC B1317/B1318[ADVANCED KEYLESS SYSTEM]

id0902e1802400

| | |
|---|---|
| **DTC B1317** | **Keyless control module power supply voltage increases (16.1 V or more).** |
| **DTC B1318** | **Keyless control module power supply voltage decreases (less than 9 V).** |
| **POSSIBLE CAUSE** | • When the keyless control module power supply voltage is not **within 9—16 V** |
| **POSSIBLE CAUSE** | • Open or short circuit in wiring harness between battery and keyless control module<br>• Battery malfunction<br>• Keyless control module malfunction |



### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FUSE**<br>• Remove the ROOM fuse.<br>• Is the fuse normal? | Yes | Go to the next step. |
| | | No | Replace the fuse. |
| 2 | **INSPECT BATTERY**<br>• Measure the battery positive voltage.<br>• Is the voltage **9 V—16 V**? | Yes | Go to the next step. |
| | | No | The battery has a malfunction.<br>Inspect the charge/discharge system/ |
| 3 | **INSPECT WIRING HARNESS BETWEEN BATTERY AND KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Measure the keyless control module terminal 2A voltage<br>• Is the voltage **9 V—16 V**? | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### DTC B2170[ADVANCED KEYLESS SYSTEM]

id0902e1802500

| DTC B2170 | Push switch. |
|---|---|
| DETECTION CONDITION | • Detect the push switch OFF signal when ignition switch is ON position. |
| POSSIBLE CAUSE | • Steering lock unit malfunction<br>• Open or short circuit in wiring harness between keyless control module and steering lock unit<br>• Keyless control module malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and steering lock unit connector.<br>• Is there continuity between keyless control module terminal 3E and steering lock unit terminal E? | Yes | Replace the steering lock unit and perform the resetting procedure for the steering lock unit. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) |
| | | No | Repair the wiring harness between the steering lock unit and keyless control module. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B2170 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### DTC B1126[ADVANCED KEYLESS SYSTEM]

id0902e1802600

| DTC B1126 | Steering lock unit internal malfunction. |
|---|---|
| DETECTION CONDITION | • **Detect the steering lock unit maifunction signal** |
| POSSIBLE CAUSE | • Steering lock unit maifunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT STEERING LOCK UNIT**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1126 | Yes | Replace the steering lock unit and perform the resetting procedure for the advanced keyless system when replacing the keyless control module. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC U0236[ADVANCED KEYLESS SYSTEM]

id0902e1802700

| DTC U0236 | Steering lock unit communication system. |
|---|---|
| DETECTION CONDITION | • Steering lock unit communication error. |
| POSSIBLE CAUSE | • Steering lock unit maifunction<br>• Open or short circuit in wiring harness between keyless control module and steering lock unit<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and steering lock unit connector.<br>• Is there continuity between keyless control module terminal 3H and steering lock unit terminal K? | Yes | Replace the steering lock unit and perform the resetting procedure for the steering lock unit.<br>(See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.) |
| | | No | Repair the wiring harness between the steering lock unit and keyless control module..<br>Go to next step |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: U0236 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B1093[ADVANCED KEYLESS SYSTEM]

id0902e1802800



| DTC B1093 | Unprogrammed steering lock unit. |
|---|---|
| DETECTION CONDITION | • Unprogrammed steering lock unit. |
| POSSIBLE CAUSE | • Steering lock unit malfunction<br>• Open or short circuit in wiring harness between keyless control module and steering lock unit<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and steering lock unit connector.<br>• Is there continuity between keyless control module terminal 3H and steering lock unit terminal E? | Yes | Perform the resetting procedure for the steering lock unit.<br>(See 09-14-35 STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].)<br>Go to the next step |
| | | No | Repair the wiring harness between the steering lock unit and keyless control module.<br>Go to the next step |
| 2 | **INSPECT STEERING LOCK UNIT**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1093 | Yes | Replace the steering lock unit and perform the resetting procedure for the steering lock unit..<br>(See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)<br>Go to the next step |
| | | No | DTC troubleshooting completed. |
| 3 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1093 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC U0214[ADVANCED KEYLESS SYSTEM]

id0902e1802900

| DTC U0214 | Keyless receiver. |
|---|---|
| DETECTION CONDITION | • When the keyless receiver power supply voltage is **less than 7.5 V**. |
| POSSIBLE CAUSE | • Keyless receiver malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless receiver<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT WIRING HARNESS BETWEEN KEYLESS RECEIVER AND GROUND**<br>• Disconnect keyless receiver connector.<br>• Is there continuity between keyless receiver terminal E and ground? | Yes | Go to next step. |
| | | No | Repair the wiring harness between the keyless receiver and ground.<br>Go to next step. |
| 2 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless receiver connector.<br>• Inspect the continuity between the following connector terminals/<br>— keyless control module: 3A—keyless receiver: A<br>— keyless control module: 3C—keyless receiver: C<br>• Is voltage **more than 7.5 V**? | Yes | Go to next step. |
| | | No | Repair the wiring harness between the keyless receiver and ground.<br>Go to next step. |
| 3 | **INSPECT KEYLESS RECEIVER POWER SUPPLY CIRCUIT**<br>• Turn the ignition switch to the ON position.<br>• Measure voltage at terminal 3A of keyless control module connector.<br>• Is voltage **more than 7.5 V**? | Yes | Replace keyless receiver.<br>(See 09-14-36 KEYLESS RECEIVER REMOVAL/ INSTALLATION.) |
| | | No | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |

## DTC B1133[ADVANCED KEYLESS SYSTEM]

id0902e1803000

| DTC B1133 | Keyless antenna (exterior, LF) |
|---|---|
| DETECTION CONDITION | • Keyless antenna dose not operated. |
| POSSIBLE CAUSE | • Keyless antenna (exterior, LF) malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless antenna<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless antenna (exterior, LF) connector.<br>• Inspect the continuity between the following connector terminals.<br>— keyless control module: 1A—keyless antenna: A<br>— keyless control module: 1B—keyless antenna: B<br>• Is there continuity? | Yes | Replace keyless antenna (driver's door).<br>(See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>Go to next step. |
| | | No | Repair the wiring harness between the keyless antenna (exterior, LF) and keyless control module.<br>Go to next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1133 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B1132[ADVANCED KEYLESS SYSTEM]

id0902e1803100

| DTC B1132 | Keyless antenna (exterior, RF) |
|---|---|
| DETECTION CONDITION | • Keyless antenna dose not operated. |
| POSSIBLE CAUSE | • Keyless antenna (exterior, RF) malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless antenna<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless antenna (exterior, RF) connector.<br>• Inspect the continuity between the following connector terminals.<br>— keyless control module: 1C—keyless antenna: A<br>— keyless control module: 1D—keyless antenna: B<br>• Is there continuity? | Yes | Replace keyless antenna (exterior, RF).<br>(See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>Go to next step. |
| | | No | Repair the wiring harness between the keyless antenna (exterior, RF) and keyless control module.<br>Go to next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1132 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |



## DTC B1128[ADVANCED KEYLESS SYSTEM]

id0902e1803300

| DTC B1128 | Keyless antenna (interior, rear) |
|---|---|
| DETECTION CONDITION | • Keyless antenna dose not operated. |
| POSSIBLE CAUSE | • Keyless antenna (interior, rear) malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless antenna<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless antenna (interior, rear) connector.<br>• Inspect the continuity between the following connector terminals.<br>— keyless control module: 1I—keyless antenna: A<br>— keyless control module: 1J—keyless antenna: B<br>• Is there continuity? | Yes | Replace keyless antenna (interior, rear).<br>(See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>Go to next step. |
| | | No | Repair the wiring harness between the keyless antenna (interior, rear) and keyless control module.<br>Go to next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1128 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B1131[ADVANCED KEYLESS SYSTEM]

id0902e1803400

| DTC B1131 | Keyless antenna (exterior, rear) |
|---|---|
| DETECTION CONDITION | • Keyless antenna dose not operated. |
| POSSIBLE CAUSE | • Keyless antenna (exterior, rear) malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless antenna<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless antenna (exterior, rear) connector.<br>• Inspect the continuity between the following connector terminals.<br>— keyless control module: 1E—keyless antenna: A<br>— keyless control module: 1F—keyless antenna: B<br>• Is there continuity? | Yes | Replace keyless antenna (exterior, rear). (See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>Go to next step. |
| | | No | Repair the wiring harness between the keyless antenna (exterior, rear) and keyless control module.<br>Go to next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1131 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B1129[ADVANCED KEYLESS SYSTEM]

id0902e1803500

| DTC B1129 | Keyless antenna (interior, middle) |
|---|---|
| DETECTION CONDITION | • Keyless antenna dose not operated. |
| POSSIBLE CAUSE | • Keyless antenna (interior, middle) malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless antenna<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless antenna (interior, middle) connector.<br>• Inspect the continuity between the following connector terminals.<br>— keyless control module: 1M—keyless antenna: A<br>— keyless control module: 1N—keyless antenna: B<br>• Is there continuity? | Yes | Replace keyless antenna (interior, middle). (See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>Go to next step. |
| | | No | Repair the wiring harness between the keyless antenna (interior, middle) and keyless control module.<br>Go to next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1129 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B112A[ADVANCED KEYLESS SYSTEM]

id0902e1803600

| DTC B112A | Keyless antenna (interior, front) |
|---|---|
| DETECTION CONDITION | • Keyless antenna dose not operated. |
| POSSIBLE CAUSE | • Keyless antenna (interior, front) malfunction<br>• Open or short circuit in wiring harness between keyless control module and keyless antenna<br>• Keyless control module malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COMMUNICATION CIRCUIT FOR CONTINUITY**<br>• Disconnect keyless control module connector and keyless antenna (interior, front) connector.<br>• Inspect the continuity between the following connector terminals.<br>— keyless control module: 1O—keyless antenna: A<br>— keyless control module: 1P—keyless antenna: B<br>• Is there continuity? | Yes | Replace keyless antenna (interior, front).<br>(See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>Go to next step. |
| | | No | Repair the wiring harness between the keyless antenna (interior, front) and keyless control module.<br>Go to next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B112A | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |



## DTC B1134[ADVANCED KEYLESS SYSTEM]

id0902e1385300

| DTC B1134 | Unprogrammed card key. |
|---|---|
| POSSIBLE CAUSE | • Unprogrammed card key<br>• Malfunction in the keyless control module internal circuit |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY NUMBER OF REGISTERED CARD KEYS**<br>• Using the WDS or equivalent, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02A-4 PID/DATA MONITOR TABLE[ADVANCED KEYLESS SYSTEM])<br>• Is card key registered? | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | Using the WDS or equivalent, register a card key if necessary.<br>(See 09-14-33 CARD KEY ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM])<br>Go to the next step. |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— M-MDS: B1134 | Yes | Replace the keyless control module and perform the resetting procedure for the advanced keyless system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

# 09-02B ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

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## FOREWORD[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3800100

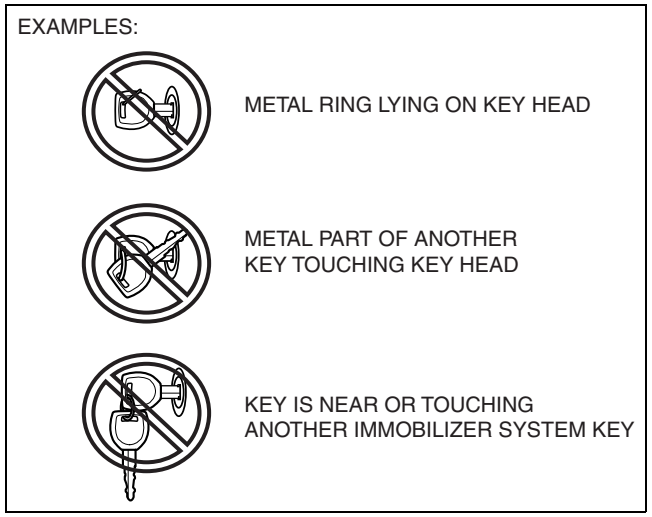
- Malfunction diagnosis of the immobilizer system occurs automatically when the ignition switch is turned from the LOCK (ACC) to the ON (START) position.
- Results of the malfunction diagnosis can be verified from the DTCs. There are two methods of DTC verification: By the flashing pattern of the security light and by using the M-MDS.
- First, verify that the fuses are normal.
- The PID/data monitor function can be used to verify the number of key ID numbers registered for a single vehicle.

**Caution**

- **Always use the M-MDS or equivalent to verify DTCs even if the security light displays a DTC. If the security light itself has a malfunction, it is possible that a DTC may not be properly displayed. There are certain DTCs which can only be verified using the M-MDS, not the security light.**
- **DTCs for the immobilizer system that are stored in the keyless unit and PCM are cleared when the ignition switch is turned from the ON to the LOCK (ACC) position.**
- **If DTCs are not displayed even though the engine does not start or stalls, perform the following symptom troubleshooting:**
  - **— 01-03-17 NO.3 WILL NOT CRANK[L3 WITH TC]**
- **The following conditions may cause poor signal communication between the key and vehicle, resulting in the engine not starting or a key registration error. Do not perform any work under the following conditions:**
  - **— If any of the following items are touching or near the key head.**
    - **Spare keys**
    - **Keys for other vehicles equipped with an immobilizer system**
    - **Any metallic object**
    - **Any electronic device, or any credit or other cards with magnetic strips**

**Note**

- If two or more abnormalities are detected as a result of malfunction diagnosis, only the DTC with the lowest number of those detected will be displayed by the security light. However, multiple DTCs are stored at the same time.
- If two or more immobilizer system DTCs are verified, first repair the part indicated by the security light displayed DTC. After completely repairing one location, turn the ignition switch from the LOCK to the ON position and perform immobilizer system malfunction diagnosis.

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## DTC INSPECTION[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3800200

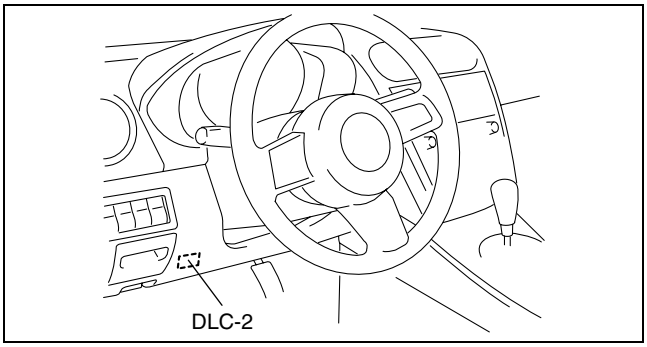
**Security Light**

1. Turn the ignition switch to the ON position.
2. Verify the security light state.
   - If there is any malfunction:
     - — After any malfunction is detected, the security light will function as follows **for approx. 1 min**.
       - DTC 16 and lower: Flashes
       - DTC 21 and higher: Illuminated
   - If there is no malfunction:
     - — The security light illuminates **for approx. 3 s** and goes out.

3. When any malfunction has been detected, read DTCs via flashing patterns displayed after the security light flashes or is illuminated **for approx. 1 min**.
   - Perform troubleshooting according to the corresponding DTC inspection.

**Note**
- A verified DTC is flashed 10 times repeatedly by the security light.
- If multiple DTCs are verified, the security light displays only the smallest DTC.

**M-MDS**
1. Connect the M-MDS to the DLC-2.
2. Verify if any DTCs are displayed.
   - If any DTCs are displayed, carry out troubleshooting according to the corresponding DTC inspection.
3. Disconnect the M-MDS.



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**DTC TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]**

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| DTC | | | | Detection condition | Page |
|---|---|---|---|---|---|
| Security light flashing pattern | | M-MDS display* | | | |
| | | Keyless control module | PCM | | |
| 11 | | B1681 | P1260 | No detected communication with the coil | 09-02B-5 SECURITY LIGHT 11, DTC B1681/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| 12 | | B2103 | P1260 | Coil malfunction | 09-02B-6 SECURITY LIGHT 12, DTC B2103/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| 13 | | B1600 | P1260 | The key ID number data cannot be read | 09-02B-7 SECURITY LIGHT 13, DTC B1600/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| | | B2431 | P1260 | Key ID number registration error | 09-02B-8 SECURITY LIGHT 13, DTC B2431/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| 14 | | B1602 | P1260 | The keyless control module cannot read key ID number data normally | 09-02B-9 SECURITY LIGHT 14, DTC B1602/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| 15 | | B1601 | P1260 | The keyless control module has detected unregistered key ID number. | 09-02B-10 SECURITY LIGHT 15, DTC B1601/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |

| DTC | | | | Detection condition | Page |
|---|---|---|---|---|---|
| Security light flashing pattern | | M-MDS display* | | | |
| | | Keyless control module | PCM | | |
| 16 | | U2510 | P1260 | Communication error between the keyless control module and the PCM (no response) | 09-02B-11 SECURITY LIGHT 16, DTC U2510/ P1260, U1147/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| | | U1147 | P1260 | Communication error between the keyless control module and the PCM (mismatched conditions) | |
| 21 | | B1213 | P1260 | Only one key ID number is registered. | 09-02B-12 SECURITY LIGHT 21, DTC B1213/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| 22 | | B2141 | P1260 | Communication error between the keyless control module and the PCM (data transfer error) | 09-02B-13 SECURITY LIGHT 22, DTC B2141/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| 23 | | B2139 | P1260 | ID number data in the PCM and the keyless control module do not match. | 09-02B-14 SECURITY LIGHT 23, DTC B2139/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |
| Not illuminated | | B1342 | - | Keyless control module malfunction | 09-02B-14 DTC B1342[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)] |

* : The letters at the beginning of each DTC are only displayed when using the M-MDS, and refer to the following: B= Body system, P= Powertrain system, U= Network communication system.

### PID/DATA MONITOR INSPECTION[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

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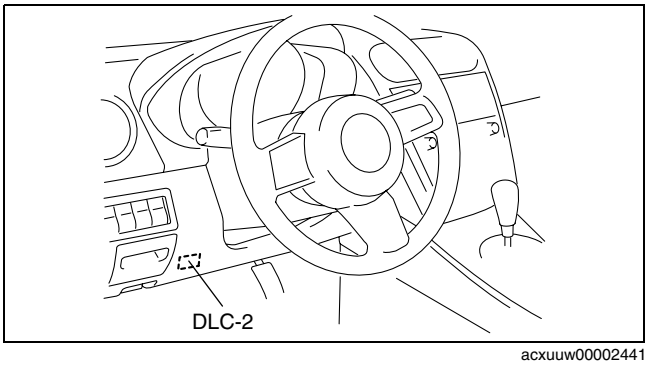
1. Connect the M-MDS to the DLC-2.
2. Display the PID/data monitor items.
   - Verify a displayed item according to the PID/ data monitor table.
3. Disconnect the M-MDS.

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### PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

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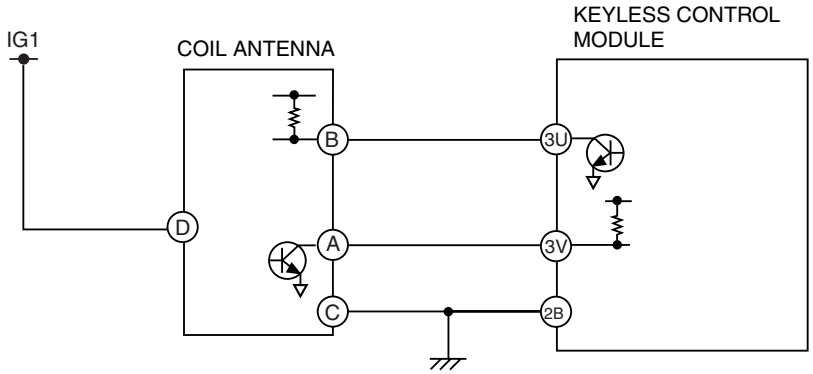
| PID name (definition) | Detection condition |
|---|---|
| NUMKEYS<br>(Number of key ID numbers registered in the instrument cluster) | Number of key ID numbers registered: 0— 8 |

## SECURITY LIGHT 11, DTC B1681/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3800600

| | |
|---|---|
| **SECURITY LIGHT: 11**<br>**DTC: B1681/P1260** | No detected communication with the coil antenna |
| **DETECTION CONDITION** | • No detected communication with the coil antenna |
| **POSSIBLE CAUSE** | • Coil antenna malfunction<br>• Instrument keyless control module<br>• Malfunction in the related wiring harnesses |




### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COIL ANTENNA POWER SUPPLY SYSTEM**<br>• Disconnect the coil antenna connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal D.<br>— Is the voltage **8 V or more**? | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |
| 2 | **INSPECT WIRING HARNESS BETWEEN COIL ANTENNA AND GROUND**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the wiring harness between coil antenna terminal C and ground for the following:<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |
| 3 | **INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT**<br>• Connect the coil antenna connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal B.<br>— Is the voltage **8 V or more**? | Yes | Go to Step 7. |
| | | No | Go to the next step. |
| 4 | **INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the keyless control module connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at keyless control module terminal 3U.<br>— Is the voltage **8 V or more**? | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | Go to the next step. |
| 5 | **INSPECT COMMUNICATION CIRCUIT (INPUT) FOR CONTINUITY**<br>• Turn the ignition switch to the LOCK position.<br>• Is there continuity between coil antenna terminal B and keyless control module terminal 3U? | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT**<br>• Measure the resistance between coil antenna terminal B and ground.<br>— Is the resistance **10 kilohms or more**? | Yes | Replace the coil antenna.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Repair the wiring harness. |
| 7 | **INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT**<br>• Connect the coil antenna connector and the keyless control module connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal A.<br>— Is the voltage **8 V or more**? | Yes | Replace the coil antenna.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Go to the next step. |
| 8 | **INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the coil antenna connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal A.<br>— Is the voltage **8 V or more**? | Yes | Replace the coil antenna.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Go to the next step. |
| 9 | **INSPECT COMMUNICATION CIRCUIT (OUTPUT) FOR CONTINUITY**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the keyless control module connector.<br>• Is there continuity between coil antenna terminal A and keyless control module terminal 3V? | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 10 | **INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT**<br>• Measure the resistance between keyless control module terminal 3V and ground.<br>— Is the resistance **10 kilohms or more**? | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | Repair the wiring harness. |

### SECURITY LIGHT 12, DTC B2103/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

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| | |
|---|---|
| **SECURITY LIGHT: 12**<br>**DTC: B2103/P1260** | • Coil antenna malfunction<br>• The PCM determined a malfunction in the coil antenna even though it is normal. |
| **DETECTION CONDITION** | • Coil antenna malfunction<br>• The PCM determined a malfunction in the coil antenna even though it is normal. |
| **POSSIBLE CAUSE** | • Coil antenna malfunction<br>• Poor connection of the coil antenna connector<br>• PCM malfunction |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT CONNECTOR CONNECTION**<br>• Are the coil antenna connector and the keyless control module connector securely connected? | Yes | Replace the coil antenna, then go to the next step.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Connect the connector securely. |
| 2 | **INSPECT PCM**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 12<br>— M-MDS: B2103/P1260 | Yes | Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 13, DTC B1600/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3800800

| | |
|---|---|
| **SECURITY LIGHT: 13**<br>**DTC: B1600/P1260** | The key ID number data cannot be read. |
| **DETECTION CONDITION** | • The key ID number data cannot be read. |
| **POSSIBLE CAUSE** | • No transponder in the key<br>• Transponder malfunction (Key ID number is not output)<br>• Coil antenna malfunction<br>• Keyless control module malfunction<br>• Any of the following items are touching or near the key head.<br>— Spare keys<br>— Keys for other vehicles equipped with an immobilizer system<br>— Any metallic object<br>— Any electronic device, or any credit or other cards with magnetic strips<br><br>EXAMPLES:<br> METAL RING LYING ON KEY HEAD<br> METAL PART OF ANOTHER KEY TOUCHING KEY HEAD<br> KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY |

09-02B

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Is B1600/P1260 displayed? | Yes | Go to Step 3. |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC**<br>• Is B2431/P1260 displayed? | Yes | Perform the DTC inspection for “SECURITY LIGHT: 13, M-MDS: B2431/P1260”. (See 09-02B-8 SECURITY LIGHT 13, DTC B2431/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].) |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER KEY IS VALID OR NOT**<br>• Are there any keys with which the engine can be started, other than the key that is a cause of the displayed DTC? | Yes | Go to Step 5. |
| | | No | Go to the next step. |
| 4 | **VERIFY WHETHER MALFUNCTION IS IN KEY OR COIL ANTENNA**<br>• Using the M-MDS, register an additional key. (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Verify the DTC using the M-MDS.<br>— Is B1600/P1260 displayed again? | Yes | Replace the coil antenna, then go to Step 6. (See 09-14-11 COIL ANTENNA REMOVAL/INSTALLATION.) |
| | | No | • Dispose of the malfunctioning key.<br>• Register a new key if necessary. (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY WHETHER MALFUNCTION IS IN KEY OR COIL ANTENNA**<br>• Using another valid key, turn the ignition switch to the ON position.<br>• Verify the DTC Using the M-MDS.<br>— Is B1600/P1260 displayed again? | Yes | Replace the coil antenna, then go to the next step. (See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | • Dispose of the malfunctioning key.<br>• Register a new key if necessary. (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| 6 | **INSPECT KEYLESS CONTROL MODULE**<br>• Using the registered key, turn the ignition switch to the ON position.<br>— Is B1600/P1260 displayed again? | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 13, DTC B2431/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3800900

| | |
|---|---|
| **SECURITY LIGHT: 13**<br>**DTC: B2431/P1260** | Key ID number registration error |
| **DETECTION CONDITION** | • Key ID number registration error |
| **POSSIBLE CAUSE** | • Errors during key ID number registration procedure<br>• Any of the following items are touching or near the key head.<br>— Spare keys<br>— Keys for other vehicles equipped with an immobilizer system<br>— Any metallic object<br>— Any electronic device, or any credit or other cards with magnetic strips<br><br>EXAMPLES:<br> METAL RING LYING ON KEY HEAD<br> METAL PART OF ANOTHER KEY TOUCHING KEY HEAD<br> KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Is B2431/P1260 displayed? | Yes | Go to Step 3. |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC**<br>• Is B1600/P1260 displayed? | Yes | Perform the DTC inspection for “SECURITY LIGHT: 13, M-MDS: B1600/P1260”. (See 09-02B-7 SECURITY LIGHT 13, DTC B1600/ P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT KEYLESS CONTROL MODULE**<br>• Using the M-MDS, clear the key ID number and re-register it.<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br><br>**Note**<br>• Two or more keys must be registered to start the engine.<br><br>• Using the registered key, turn the ignition switch to the ON position.<br>• Verify the DTC Using the M-MDS.<br>— Is B2431/P1260 displayed again? | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### SECURITY LIGHT 14, DTC B1602/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3801000

| | |
|---|---|
| **SECURITY LIGHT: 14**<br>**DTC: B1602/P1260** | The keyless control module cannot read key ID number data normally. |
| **DETECTION CONDITION** | • The keyless control module cannot read key ID number data normally. |
| **POSSIBLE CAUSE** | • Transponder (key) malfunction<br>• Coil antenna malfunction<br>• Keyless control module malfunction<br>• Any of the following items are touching or near the key head.<br>— Spare keys<br>— Keys for other vehicles equipped with an immobilizer system<br>— Any metallic object<br>— Any electronic device, or any credit or other cards with magnetic strips<br><br>EXAMPLES:<br> METAL RING LYING ON KEY HEAD<br> METAL PART OF ANOTHER KEY TOUCHING KEY HEAD<br> KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY WHETHER KEY IS VALID OR NOT**<br>• Using another registered key, turn the ignition switch to the ON position.<br>• If there is not another registered key, register an additional key using the M-MDS and turn the ignition key to the ON position using the registered key.<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Is the DTC displayed again?<br>— Security light: 14<br>— M-MDS: B1602/P1260 | Yes | Replace the coil antenna, then go to the next step.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | • Dispose of the malfunctioning key.<br>• Register a new key if necessary.<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| 2 | **INSPECT KEYLESS CONTROL MODULE**<br>• Using another registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed again?<br>— Security light: 14<br>— M-MDS: B1602/P1260 | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control modulekeyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

**SECURITY LIGHT 15, DTC B1601/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]**

id0902e3801100

| | |
|---|---|
| **SECURITY LIGHT: 15**<br>**DTC: B1601/P1260** | The keyless control modulehas detected unregistered key ID number. |
| **DETECTION CONDITION** | • The keyless control module has detected unregistered key ID number. |
| **POSSIBLE CAUSE** | • No keys have been registered after replacing the keyless control module.<br>• Unregistered key used<br>• Attempt made to register a ninth key<br>• Keyless control module malfunction |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY NUMBER OF REGISTERED KEYS**<br>• Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02B-4 PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].)<br>• Are one or more keys registered? | Yes | Go to the next step. |
| | | No | Go to Step 3. |
| 2 | **VERIFY NUMBER OF REGISTERED KEYS**<br>• Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02B-4 PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].)<br>• Are eight keys registered? | Yes | Using the M-MDS, clear the key ID numbers as necessary, then go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT KEYLESS CONTROL MODULE**<br>• Using the M-MDS, register the key ID number. (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>**Note**<br>• Two or more keys must be registered to start the engine.<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed again?<br>— Security light: 15<br>— M-MDS: B1601/P1260 | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### SECURITY LIGHT 16, DTC U2510/P1260, U1147/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3801200

| | | |
|---|---|---|
| **SECURITY LIGHT: 16** | **DTC: U2510/P1260** | Communication error between the keyless control module and the PCM (no response) |
| | **DTC: U1147/P1260** | Communication error between the keyless control module and the PCM (mismatched conditions) |
| **DETECTION CONDITION** | | **Keyless control module DTC: U2510**<br>• Communication error between the keyless control module and the PCM (no response)<br>**Keyless control module DTC: U1147**<br>• Communication error between the keyless control module and the PCM (mismatched conditions) |
| **POSSIBLE CAUSE** | | • Malfunction in the wiring harness (CAN line) between the keyless control module and the PCM<br>• PCM malfunction<br>• Keyless control module malfunction |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Are either U1900 or U0073, or both, displayed, by either the keyless control module or the PCM, or both? | Yes | Perform troubleshooting according to the corresponding DTC inspection. (See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) Go to the next step. |
| 2 | **VERIFY DTC**<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 16<br>— M-MDS: U2510 or U1147/P1260 | Yes | Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 21, DTC B1213/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3801300

| | |
|---|---|
| **SECURITY LIGHT: 21**<br>**DTC: B1213/P1260** | Only one key ID number is registered. |
| **DETECTION CONDITION** | • Only one key is registered. |
| **POSSIBLE CAUSE** | • Only one registered key |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY NUMBER OF REGISTERED KEYS**<br>• Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02B-4 PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)].)<br>• Are two or more keys registered? | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | • Using the M-MDS, clear the key ID number and register a new key if necessary.<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Go to the next step. |
| 2 | **VERIFY DTC**<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed again?<br>— Security light: 21<br>— M-MDS: B1213/P1260 | Yes | Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 22, DTC B2141/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3801400

| | |
|---|---|
| **SECURITY LIGHT: 22**<br>**DTC: B1241/P1260** | Communication error between the keyless control module and the PCM (data transfer error) |
| **DETECTION CONDITION** | • Communication error between the keyless control module and the PCM (data transfer error) |
| **POSSIBLE CAUSE** | • Malfunction in the wiring harness (CAN line) between the keyless control module and the PCM<br>• Keyless control module malfunction<br>• PCM malfunction |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Are either U1900 or U0073, or both displayed, by either the keyless control module or the PCM, or both? | Yes | Perform troubleshooting according to the corresponding DTC inspection. (See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC**<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 22<br>— M-MDS: B2141/P1260 | Yes | • Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Go to the next step. |
| | | No | DTC troubleshooting completed. |
| 3 | **EXAMINE KEYLESS CONTROL MODULE AND PCM**<br>• Is the DTC displayed again?<br>— Security light: 22<br>— M-MDS B2141/P1260 | Yes | • Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module. (See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Go to the next step. |
| | | No | DTC troubleshooting completed. |
| 4 | **EXAMINE PCM**<br>• Is the DTC displayed again?<br>— Security light: 22<br>— M-MDS: B2141/P1260 | Yes | • Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### SECURITY LIGHT 23, DTC B2139/P1260[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3801500

| | |
|---|---|
| **SECURITY LIGHT: 23**<br>**DTC: B2139/P1260** | ID number data in the PCM and the keyless control module do not match. |
| **DETECTION CONDITION** | • ID number data in the keyless control module and the PCM are different. |
| **POSSIBLE CAUSE** | • Necessary procedures were not performed using the M-MDS after replacing the PCM.<br>• Keyless control module malfunction<br>• PCM malfunction |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Are either U1900 or U0073, or both, displayed, by either the keyless control module or the PCM, or both? | Yes | Perform troubleshooting according to the corresponding DTC inspection.<br>(See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Go to the next step. |
| 2 | **EXAMINE KEYLESS CONTROL MODULE AND PCM**<br>• Perform procedures for when replacing the PCM only.<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 23<br>— M-MDS: B2139/P1260 | Yes | • Replace the keyless control module and perform the resetting procedure for the immobilizer system when replacing the keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)<br>• Go to the next step. |
| | | No | DTC troubleshooting completed. |
| 3 | **VERIFY DTC**<br>• Is the DTC displayed again?<br>— Security light: 23<br>— M-MDS: B2139/P1260 | Yes | • Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### DTC B1342[IMMOBILIZER SYSTEM (ADVANCED KEYLESS SYSTEM)]

id0902e3801600

| | |
|---|---|
| **DTC B1342** | **ECU is faulted** |
| **DETECTION CONDITION** | Keyless control module malfunction |
| **POSSIBLE CAUSE** | • Keyless control module malfunction |

**Diagnostic procedure**

| ACTION |
|---|
| Replace the Keyless control module.<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].) |

# 09-02C ON-BOARD DIAGNOSTIC [IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]


**FOREWORD[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–2**
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M-MDS . . . . . **09-02C–3**
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**SECURITY LIGHT 11, DTC B1681/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–5**
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**SECURITY LIGHT 13, DTC B2431/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–9**
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**SECURITY LIGHT 14, DTC B1602/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–10**
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**SECURITY LIGHT 15, DTC B1601/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–11**
Diagnostic Procedure . . . . . **09-02C–11**
**SECURITY LIGHT 16, DTC U2510/P1260, U1147/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–12**
Diagnostic Procedure . . . . . **09-02C–12**
**SECURITY LIGHT 21, DTC B1213/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–12**
Diagnostic Procedure . . . . . **09-02C–12**
**SECURITY LIGHT 22, DTC B2141/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–13**
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**SECURITY LIGHT 23, DTC B2139/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–14**
Diagnostic Procedure . . . . . **09-02C–14**
**DTC B1342[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] . . . . . 09-02C–14**

## FOREWORD[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

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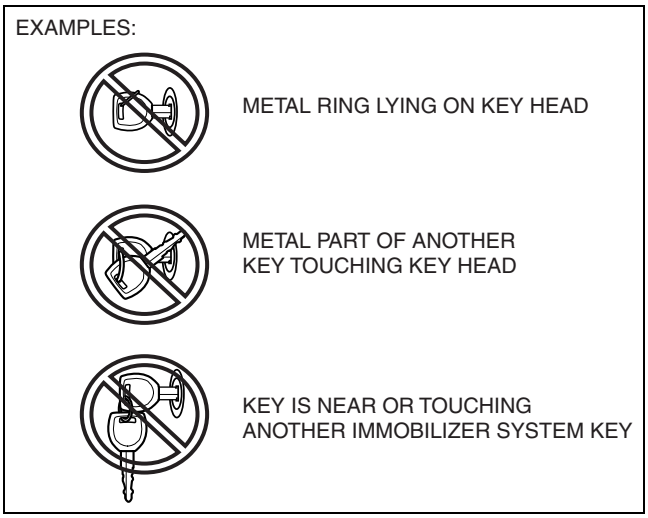
- Malfunction diagnosis occurs automatically when the ignition switch is turned from the LOCK (ACC) to the ON (START) position.
- If the results of the malfunction diagnosis show a malfunction, the security light displays a DTC and the PCM stores the DTC. DTCs stored in the PCM can be verified using the M-MDS.
- DTCs for the immobilizer system that are stored in the PCM are cleared when the ignition switch is turned from the ON to the LOCK (ACC) position.
- There are certain DTCs which can only be verified using the M-MDS, not the security light.
- The PID/data monitor function can be used to verify the number of keys registered for a single vehicle.
- If DTCs are not displayed even though the engine does not start, perform the following symptom troubleshooting:
  — 01-03-17 NO.3 WILL NOT CRANK[L3 WITH TC]

**Caution**

- **Always use the M-MDS to verify DTCs even if the DTCs are verified by the security light display. If the security light has a malfunction, it is possible that a DTC may not be properly displayed.**
- **Always use the M-MDS to verify DTCs because there are certain DTCs which cannot be verified using the security light.**
- **If any of the following items are touching or near the key head, signal communication between the key and vehicle is negatively affected, resulting in the engine not starting. Do not start the engine if any of the following items are touching or near the key head.**
  - **— Any metallic object**
  - **— Spare keys or keys for other vehicles equipped with an immobilizer system**
  - **— Any electronic device, or any credit or other cards with magnetic strips**

**Note**

- If multiple DTCs are detected as a result of malfunction diagnosis, only the DTC with the lowest number of those detected will be displayed by the security light. The PCM stores multiple DTCs at the same time.
- If two or more immobilizer system DTCs are verified, first repair the part indicated by the security light displayed DTC. After repairing one location, turn the ignition switch from the LOCK to the ON position and perform an immobilizer system malfunction diagnosis.

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## DTC INSPECTION[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

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**Security Light**

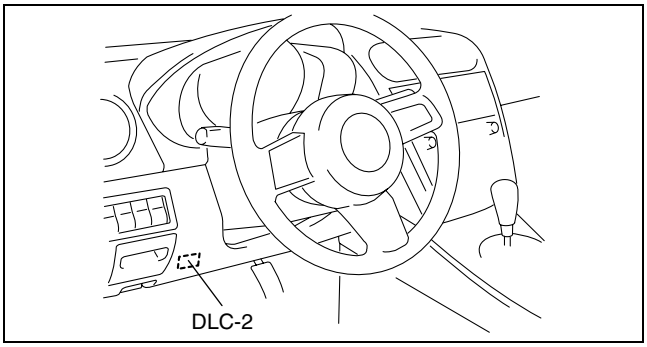
1. Turn the ignition switch to the ON position.
2. Verify the security light state.
   - If there is any malfunction:
     — After any malfunction is detected, the security light will function as follows **for approx. 1 min**.
       - DTC 16 and lower: Flashes
       - DTC 21 and higher: Illuminated
   - If there is no malfunction:
     — The security light illuminates **for approx. 3 s** and goes out.
3. When any malfunction has been detected, read DTCs via flashing patterns displayed after the security light flashes or is illuminated **for approx. 1 min**.
   - Perform troubleshooting according to the corresponding DTC inspection.

**Note**

- A verified DTC is flashed 10 times repeatedly by the security light.
- If multiple DTCs are verified, the security light displays only the smallest DTC.

**M-MDS**

1. Connect the M-MDS to the DLC-2.
2. Verify if any DTCs are displayed.
   - If any DTCs are displayed, carry out troubleshooting according to the corresponding DTC inspection.
3. Disconnect the M-MDS.

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**DTC TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]**

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| DTC | | | | Detection condition | Page |
|---|---|---|---|---|---|
| Security light flashing pattern | | M-MDS display* | | | |
| | | Instrument cluster | PCM | | |
| 11 | | B1681 | P1260 | No detected communication with the coil | 09-02C-5 SECURITY LIGHT 11, DTC B1681/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| 12 | | B2103 | P1260 | • Coil antenna malfunction<br>• The PCM determined a malfunction in the coil antenna even though it is normal. | 09-02C-7 SECURITY LIGHT 12, DTC B2103/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| 13 | | B1600 | P1260 | The key ID number data cannot be read. | 09-02C-7 SECURITY LIGHT 13, DTC B1600/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| | | B2431 | P1260 | Key ID number registration error | 09-02C-9 SECURITY LIGHT 13, DTC B2431/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| 14 | | B1602 | P1260 | The instrument cluster cannot read key ID number data normally. | 09-02C-10 SECURITY LIGHT 14, DTC B1602/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| 15 | | B1601 | P1260 | The instrument cluster has detected unregistered key ID number. | 09-02C-11 SECURITY LIGHT 15, DTC B1601/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| 16 | | U2510 | P1260 | Communication error between the instrument cluster and the PCM (no response) | 09-02C-12 SECURITY LIGHT 16, DTC U2510/ P1260, U1147/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| | | U1147 | P1260 | Communication error between the instrument cluster and the PCM (mismatched conditions) | |
| 21 | | B1213 | P1260 | Only one key ID number is registered. | 09-02C-12 SECURITY LIGHT 21, DTC B1213/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |

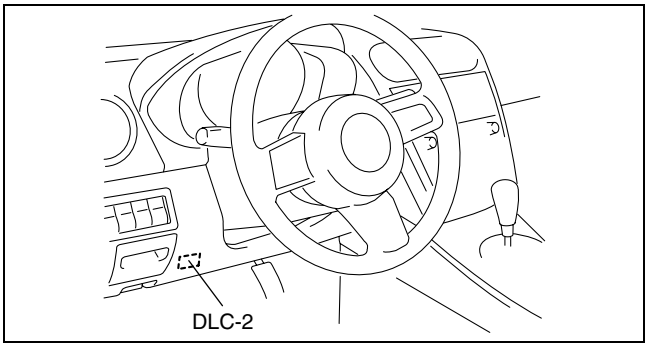
| DTC | | | | Detection condition | Page |
|---|---|---|---|---|---|
| Security light flashing pattern | | M-MDS display* | | | |
| | | Instrument cluster | PCM | | |
| 22 | | B2141 | P1260 | Communication error between the instrument cluster and the PCM (data transfer error) | 09-02C-13 SECURITY LIGHT 22, DTC B2141/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| 23 | | B2139 | P1260 | ID number data in the PCM and the instrument cluster do not match. | 09-02C-14 SECURITY LIGHT 23, DTC B2139/ P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |
| Not illuminated | | B1342 | - | Instrument cluster malfunction | 09-02C-14 DTC B1342[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)] |

* : The letters at the beginning of each DTC are only displayed when using the M-MDS, and refer to the following: B= Body system, P= Powertrain system, U= Network communication system.

### PID/DATA MONITOR INSPECTION[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800400

1. Connect the M-MDS to the DLC-2.
2. Display the PID/data monitor items.
   - Verify a displayed item according to the PID/ data monitor table.
3. Disconnect the M-MDS.

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### PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

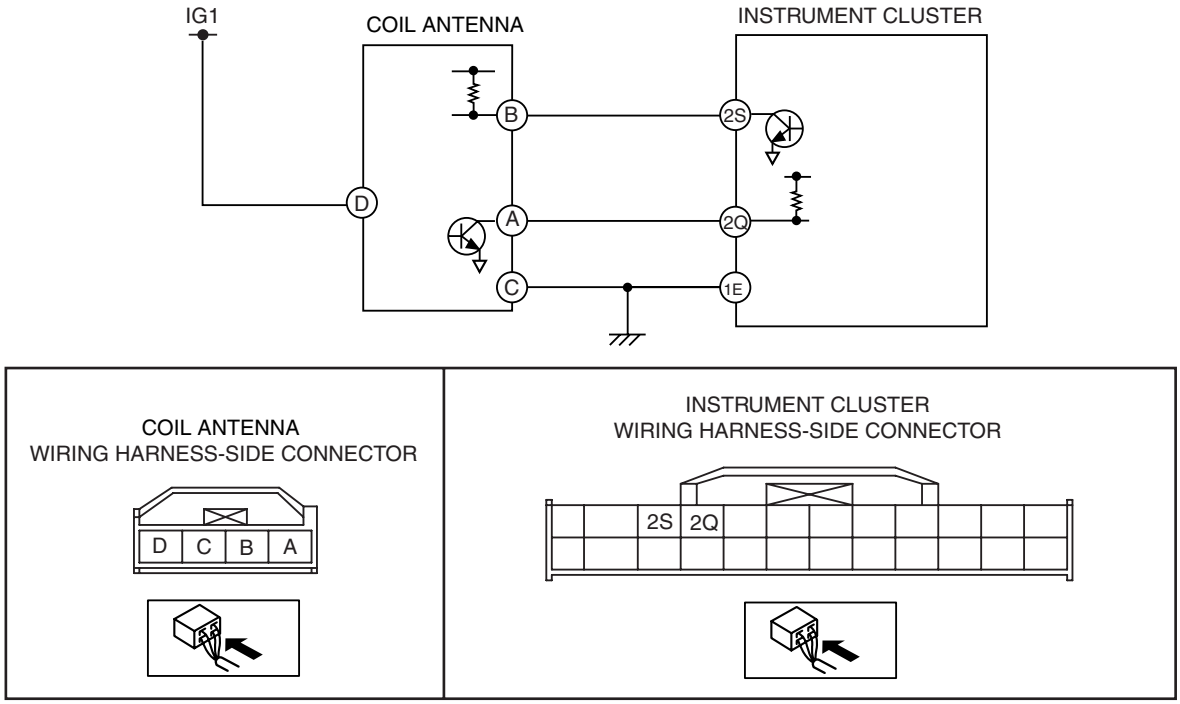
id0902e5800500

| PID name (definition) | Detection condition |
|---|---|
| NUMKEYS (Number of key ID numbers registered in the instrument cluster) | Number of key ID numbers registered: 0— 8 |

## SECURITY LIGHT 11, DTC B1681/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800600

| | |
|---|---|
| **SECURITY LIGHT: 11**<br>**DTC: B1681/P1260** | No detected communication with the coil antenna |
| **DETECTION CONDITION** | • No detected communication with the coil antenna |
| **POSSIBLE CAUSE** | • Coil antenna malfunction<br>• Instrument cluster malfunction<br>• Malfunction in the related wiring harnesses |




### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT COIL ANTENNA POWER SUPPLY SYSTEM**<br>• Disconnect the coil antenna connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal D.<br>— Is the voltage **8 V or more**? | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |
| 2 | **INSPECT WIRING HARNESS BETWEEN COIL ANTENNA AND GROUND**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the wiring harness between coil antenna terminal C and ground for the following:<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |
| 3 | **INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT**<br>• Connect the coil antenna connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal B.<br>— Is the voltage **8 V or more**? | Yes | Go to Step 7. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the instrument cluster connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at instrument cluster terminal 2S.<br>— Is the voltage **8 V or more**? | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | Go to the next step. |
| 5 | **INSPECT COMMUNICATION CIRCUIT (INPUT) FOR CONTINUITY**<br>• Turn the ignition switch to the LOCK position.<br>• Is there continuity between coil antenna terminal B and instrument cluster terminal 2S? | Yes | Go to the next step. |
| | | No | Repair the wiring harness. |
| 6 | **INSPECT COIL ANTENNA INPUT SIGNAL CIRCUIT**<br>• Measure the resistance between coil antenna terminal B and ground.<br>— Is the resistance **10 kilohms or more**? | Yes | Replace the coil antenna.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Repair the wiring harness. |
| 7 | **INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT**<br>• Connect the coil antenna connector and the instrument cluster connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal A.<br>— Is the voltage **8 V or more**? | Yes | Replace the coil antenna.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Go to the next step. |
| 8 | **INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the coil antenna connector.<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at coil antenna terminal A.<br>— Is the voltage **8 V or more**? | Yes | Replace the coil antenna.<br>(See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Go to the next step. |
| 9 | **INSPECT COMMUNICATION CIRCUIT (OUTPUT) FOR CONTINUITY**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the instrument cluster connector.<br>• Is there continuity between coil antenna terminal A and instrument cluster terminal 2Q? | Yes | Repair the wiring harness. |
| | | No | Go to the next step. |
| 10 | **INSPECT COIL ANTENNA OUTPUT SIGNAL CIRCUIT**<br>• Measure the resistance between instrument cluster terminal 2Q and ground.<br>— Is the resistance **10 kilohms or more**? | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | Repair the wiring harness. |

## SECURITY LIGHT 12, DTC B2103/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800700

| | |
|---|---|
| **SECURITY LIGHT: 12**<br>**DTC: B2103/P1260** | • Coil antenna malfunction<br>• The PCM determined a malfunction in the coil antenna even though it is normal. |
| **DETECTION CONDITION** | • Coil antenna malfunction<br>• The PCM determined a malfunction in the coil antenna even though it is normal. |
| **POSSIBLE CAUSE** | • Coil antenna malfunction<br>• Poor connection of the coil antenna connector<br>• PCM malfunction |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT CONNECTOR CONNECTION**<br>• Are the coil antenna connector and the instrument cluster connector securely connected? | Yes | Replace the coil antenna, then go to the next step. (See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | Connect the connector securely. |
| 2 | **INSPECT PCM**<br>• Turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 12<br>— M-MDS: B2103/P1260 | Yes | Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 13, DTC B1600/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800800



| | |
|---|---|
| **SECURITY LIGHT: 13**<br>**DTC: B1600/P1260** | The key ID number data cannot be read. |
| **DETECTION CONDITION** | • The key ID number data cannot be read. |
| **POSSIBLE CAUSE** | • No transponder in the key<br>• Transponder malfunction (Key ID number is not output)<br>• Coil antenna malfunction<br>• Instrument cluster malfunction<br>• Any of the following items are touching or near the key head.<br>— Spare keys<br>— Keys for other vehicles equipped with an immobilizer system<br>— Any metallic object<br>— Any electronic device, or any credit or other cards with magnetic strips<br>EXAMPLES:<br> METAL RING LYING ON KEY HEAD<br> METAL PART OF ANOTHER KEY TOUCHING KEY HEAD<br> KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Is B1600/P1260 displayed? | Yes | Go to Step 3. |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC**<br>• Is B2431/P1260 displayed? | Yes | Perform the DTC inspection for "SECURITY LIGHT: 13, M-MDS: B2431/P1260".<br>(See 09-02C-9 SECURITY LIGHT 13, DTC B2431/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) |
| | | No | Go to the next step. |
| 3 | **VERIFY WHETHER KEY IS VALID OR NOT**<br>• Are there any keys with which the engine can be started, other than the key that is a cause of the displayed DTC? | Yes | Go to Step 5. |
| | | No | Go to the next step. |
| 4 | **VERIFY WHETHER MALFUNCTION IS IN KEY OR COIL ANTENNA**<br>• Using the M-MDS, register an additional key. (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Verify the DTC using the M-MDS.<br>— Is B1600/P1260 displayed again? | Yes | Replace the coil antenna, then go to Step 6.<br>(See 09-14-11 COIL ANTENNA REMOVAL/INSTALLATION.) |
| | | No | • Dispose of the malfunctioning key.<br>• Register a new key if necessary.<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| 5 | **VERIFY WHETHER MALFUNCTION IS IN KEY OR COIL ANTENNA**<br>• Using another valid key, turn the ignition switch to the ON position.<br>• Verify the DTC Using the M-MDS.<br>— Is B1600/P1260 displayed again? | Yes | Replace the coil antenna, then go to the next step.<br>(See 09-14-11 COIL ANTENNA REMOVAL/INSTALLATION.) |
| | | No | • Dispose of the malfunctioning key.<br>• Register a new key if necessary.<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| 6 | **INSPECT INSTRUMENT CLUSTER**<br>• Using the registered key, turn the ignition switch to the ON position.<br>— Is B1600/P1260 displayed again? | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 13, DTC B2431/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5800900

| | |
|---|---|
| **SECURITY LIGHT: 13**<br>**DTC: B2431/P1260** | Key ID number registration error |
| **DETECTION CONDITION** | • Key ID number registration error |
| **POSSIBLE CAUSE** | • Errors during key ID number registration procedure<br>• Any of the following items are touching or near the key head.<br>— Spare keys<br>— Keys for other vehicles equipped with an immobilizer system<br>— Any metallic object<br>— Any electronic device, or any credit or other cards with magnetic strips<br><br>EXAMPLES:<br> METAL RING LYING ON KEY HEAD<br> METAL PART OF ANOTHER KEY TOUCHING KEY HEAD<br> KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY |

09-02C

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Is B2431/P1260 displayed? | Yes | Go to Step 3. |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC**<br>• Is B1600/P1260 displayed? | Yes | Perform the DTC inspection for “SECURITY LIGHT: 13, M-MDS: B1600/P1260”. (See 09-02C-7 SECURITY LIGHT 13, DTC B1600/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].) |
| | | No | Go to the next step. |
| 3 | **INSPECT INSTRUMENT CLUSTER**<br>• Using the M-MDS, clear the key ID number and re-register it. (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br><br>**Note**<br>• Two or more keys must be registered to start the engine.<br><br>• Using the registered key, turn the ignition switch to the ON position.<br>• Verify the DTC Using the M-MDS.<br>— Is B2431/P1260 displayed again? | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 14, DTC B1602/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801000

| | |
|---|---|
| **SECURITY LIGHT: 14**<br>**DTC: B1602/P1260** | The instrument cluster cannot read key ID number data normally. |
| **DETECTION CONDITION** | • The instrument cluster cannot read key ID number data normally. |
| **POSSIBLE CAUSE** | • Transponder (key) malfunction<br>• Coil antenna malfunction<br>• Instrument cluster malfunction<br>• Any of the following items are touching or near the key head.<br>— Spare keys<br>— Keys for other vehicles equipped with an immobilizer system<br>— Any metallic object<br>— Any electronic device, or any credit or other cards with magnetic strips<br>EXAMPLES:<br> METAL RING LYING ON KEY HEAD<br> METAL PART OF ANOTHER KEY TOUCHING KEY HEAD<br> KEY IS NEAR OR TOUCHING ANOTHER IMMOBILIZER SYSTEM KEY |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY WHETHER KEY IS VALID OR NOT**<br>• Using another registered key, turn the ignition switch to the ON position.<br>• If there is not another registered key, register an additional key using the M-MDS and turn the ignition key to the ON position using the registered key. (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Is the DTC displayed again?<br>— Security light: 14<br>— M-MDS: B1602/P1260 | Yes | Replace the coil antenna, then go to the next step. (See 09-14-11 COIL ANTENNA REMOVAL/ INSTALLATION.) |
| | | No | • Dispose of the malfunctioning key.<br>• Register a new key if necessary. (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| 2 | **INSPECT INSTRUMENT CLUSTER**<br>• Using another registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed again?<br>— Security light: 14<br>— M-MDS: B1602/P1260 | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/ INSTALLATION.) (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 15, DTC B1601/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801100

| | |
|---|---|
| **SECURITY LIGHT: 15**<br>**DTC: B1601/P1260** | The instrument cluster has detected unregistered key ID number. |
| **DETECTION CONDITION** | • The instrument cluster has detected unregistered key ID number. |
| **POSSIBLE CAUSE** | • No keys have been registered after replacing the instrument cluster.<br>• Unregistered key used<br>• Attempt made to register a ninth key<br>• Instrument cluster malfunction |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY NUMBER OF REGISTERED KEYS**<br>• Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02C-4 PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)<br>• Are one or more keys registered? | Yes | Go to the next step. |
| | | No | Go to Step 3. |
| 2 | **VERIFY NUMBER OF REGISTERED KEYS**<br>• Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02C-4 PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)<br>• Are eight keys registered? | Yes | Using the M-MDS, clear the key ID numbers as necessary, then go to the next step. |
| | | No | Go to the next step. |
| 3 | **INSPECT INSTRUMENT CLUSTER**<br>• Using the M-MDS, register the key ID number.<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>**Note**<br>• Two or more keys must be registered to start the engine.<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed again?<br>— Security light: 15<br>— M-MDS: B1601/P1260 | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 16, DTC U2510/P1260, U1147/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801200

| | | |
|---|---|---|
| **SECURITY LIGHT: 16** | **DTC: U2510/P1260** | Communication error between the instrument cluster and the PCM (no response) |
| | **DTC: U1147/P1260** | Communication error between the instrument cluster and the PCM (mismatched conditions) |
| **DETECTION CONDITION** | | **Instrument cluster DTC: U2510**<br>• Communication error between the instrument cluster and the PCM (no response)<br>**Instrument cluster DTC: U1147**<br>• Communication error between the instrument cluster and the PCM (mismatched conditions) |
| **POSSIBLE CAUSE** | | • Malfunction in the wiring harness (CAN line) between the instrument cluster and the PCM<br>• PCM malfunction<br>• Instrument cluster malfunction |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Are either U1900 or U0073, or both, displayed, by either the instrument cluster or the PCM, or both? | Yes | Perform troubleshooting according to the corresponding DTC inspection.<br>(See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>Go to the next step. |
| 2 | **VERIFY DTC**<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 16<br>— M-MDS: U2510 or U1147/P1260 | Yes | Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 21, DTC B1213/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801300

| | |
|---|---|
| **SECURITY LIGHT: 21**<br>**DTC: B1213/P1260** | Only one key ID number is registered. |
| **DETECTION CONDITION** | • Only one key is registered. |
| **POSSIBLE CAUSE** | • Only one registered key |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY NUMBER OF REGISTERED KEYS**<br>• Using the M-MDS, perform the PID/data monitor inspection and confirm the number of registered keys.<br>(See 09-02C-4 PID/DATA MONITOR TABLE[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)].)<br>• Are two or more keys registered? | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | • Using the M-MDS, clear the key ID number and register a new key if necessary.<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **VERIFY DTC**<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed again?<br>— Security light: 21<br>— M-MDS: B1213/P1260 | Yes | Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

### SECURITY LIGHT 22, DTC B2141/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801400

| | |
|---|---|
| **SECURITY LIGHT: 22**<br>**DTC: B1241/P1260** | Communication error between the instrument cluster and the PCM (data transfer error) |
| **DETECTION CONDITION** | • Communication error between the instrument cluster and the PCM (data transfer error) |
| **POSSIBLE CAUSE** | • Malfunction in the wiring harness (CAN line) between the instrument cluster and the PCM<br>• Instrument cluster malfunction<br>• PCM malfunction |

**Diagnostic Procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Are either U1900 or U0073, or both displayed, by either the instrument cluster or the PCM, or both? | Yes | Perform troubleshooting according to the corresponding DTC inspection.<br>(See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Go to the next step. |
| 2 | **VERIFY DTC**<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 22<br>— M-MDS: B2141/P1260 | Yes | • Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM.<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Go to the next step. |
| | | No | DTC troubleshooting completed. |
| 3 | **EXAMINE INSTRUMENT CLUSTER AND PCM**<br>• Is the DTC displayed again?<br>— Security light: 22<br>— M-MDS: B2141/P1260 | Yes | • Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Go to the next step. |
| | | No | DTC troubleshooting completed. |
| 4 | **EXAMINE PCM**<br>• Is the DTC displayed again?<br>— Security light: 22<br>— M-MDS: B2141/P1260 | Yes | • Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM.<br>(See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].)<br>(See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## SECURITY LIGHT 23, DTC B2139/P1260[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801500

| | |
|---|---|
| **SECURITY LIGHT: 23**<br>**DTC: B2139/P1260** | ID number data in the PCM and the instrument cluster do not match. |
| **DETECTION CONDITION** | • ID number data in the instrument cluster and the PCM are different. |
| **POSSIBLE CAUSE** | • Necessary procedures were not performed using the M-MDS after replacing the PCM.<br>• Instrument cluster malfunction<br>• PCM malfunction |

### Diagnostic Procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY DTC**<br>• Are either U1900 or U0073, or both, displayed, by either the instrument cluster or the PCM, or both? | Yes | Perform troubleshooting according to the corresponding DTC inspection. (See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Go to the next step. |
| 2 | **EXAMINE INSTRUMENT CLUSTER AND PCM**<br>• Perform procedures for when replacing the PCM only. (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Using the registered key, turn the ignition switch to the ON position.<br>• Is the DTC displayed?<br>— Security light: 23<br>— M-MDS: B2139/P1260 | Yes | • Replace the instrument cluster and perform the resetting procedure for the immobilizer system when replacing the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].)<br>• Go to the next step. |
| | | No | DTC troubleshooting completed. |
| 3 | **VERIFY DTC**<br>• Is the DTC displayed again?<br>— Security light: 23<br>— M-MDS: B2139/P1260 | Yes | • Replace the PCM and perform the resetting procedure for the immobilizer system when replacing the PCM. (See 01-40-6 PCM REMOVAL/INSTALLATION[L3 WITH TC].) (See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].) |
| | | No | DTC troubleshooting completed. |

## DTC B1342[IMMOBILIZER SYSTEM (KEYLESS ENTRY SYSTEM)]

id0902e5801600

| DTC B1342 | ECU is faulted |
|---|---|
| **DETECTION CONDITION** | Instrument cluster malfunction |
| **POSSIBLE CAUSE** | • Instrument cluster malfunction |

### Diagnostic procedure

| ACTION |
|---|
| Replace the instrument cluster.<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.) |

# 09-02D ON-BOARD DIAGNOSTIC [MULTIPLEX COMMUNICATION SYSTEM]

**MULTIPLEX COMMUNICATION SYSTEM[MULTIPLEX COMMUNICATION SYSTEM]** . . . . . **09-02D–2**
Outline . . . . . **09-02D–2**
Flowchart . . . . . **09-02D–2**
**DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]** . . . . . **09-02D–7**
**PROCEDURES FOR DETERMINING THE LOCATION OF A MALFUNCTION [MULTIPLEX COMMUNICATION SYSTEM]** . . . . . **09-02D–8**
System Wiring Diagram . . . . . **09-02D–8**
PCM . . . . . **09-02D–8**
TCM . . . . . **09-02D–9**
DSC HU/CM . . . . . **09-02D–9**
AWD Control Module . . . . . **09-02D–10**
BCM . . . . . **09-02D–10**
SAS Control Module . . . . . **09-02D–11**
Keyless Control Module . . . . . **09-02D–11**
Instrument Cluster . . . . . **09-02D–12**
Climate Control Unit . . . . . **09-02D–13**
Car- navigation Unit/Audio Unit (Base Module) . . . . . **09-02D–13**
Information display . . . . . **09-02D–13**
Repair Procedure . . . . . **09-02D–14**
**DTC U0073[MULTIPLEX COMMUNICATION SYSTEM]** . . . . . **09-02D–14**
**DTC U0516, U2516, 16:Er12 [MULTIPLEX COMMUNICATION SYSTEM]** . . . . . **09-02D–16**

## MULTIPLEX COMMUNICATION SYSTEM[MULTIPLEX COMMUNICATION SYSTEM]

id0902e6830400

### Outline

- If the controller area network (CAN) system is malfunctioning, read the DTCs of the following modules, using the M-MDS to determine the malfunctioning system.
  - — PCM
  - — TCM
  - — DSC HU/CM
  - — AWD control module
  - — BCM
  - — SAS control module
  - — Keyless control module
  - — Instrument cluster
  - — Audio amplifier
  - — Climate control unit
  - — Audio unit (base module)
  - — Car-navigation unit
  - — Information display

### Flowchart

- Use the following flowchart to verify the cause of the trouble.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DTC INDICATION**<br>• Using the M-MDS, inspect if DTCs are displayed for the following module:<br>— PCM<br>— TCM<br>— DSC HU/CM<br>— AWD control module<br>— BCM<br>— SAS control module<br>— Keyless control module<br>— Instrument cluster<br>— Audio amplifier<br>— Climate control unit<br>— Audio unit (base module)<br>— Car-navigation unit<br>— Information display<br>• Are any DTCs displayed? | Yes | Go to the next step. |
| | | No | Go to Step 5. |
| 2 | **INSPECT CAN SYSTEM-RELATED DTC**<br>• Are any DTCs other than the following displayed?<br>— U0073<br>— U0100<br>— U0101<br>— U0114<br>— U0121<br>— U0140<br>— U0151<br>— U0155<br>— U0164<br>— U0166<br>— U0181<br>— U0184<br>— U0214<br>— U0323<br>— U0415<br>— U0516<br>— U1900<br>— U2023<br>— U2516<br>— 16:Er12 | Yes | Repair the malfunctioning part by following the related DTC inspection.<br>Go to the next step. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | **INSPECT CAN SYSTEM-RELATED DTC**<br>• Are any of the following DTCs displayed?<br>— PCM: U0073, U0101, U0121, U0155<br>— TCM: U0073, U0100, U0121, U0140, U415<br>— DSC HU/CM: U0073, U0100, U0101, U0114, U0140, U1900, U2023<br>— AWD control module: U0073, U0100, U0101, U0121, U0155<br>— BCM: U0073<br>— SAS control module: U0073, U0155<br>— Keyless control module: U0073, U0100, U0140, U0323, U2023<br>— Instrument cluster: U0073, U0100, U0101, U0114, U0166, U0121, U0140, U0151, U0214, U2516<br>— Climate control unit: U0155, U0516<br>— Audio unit: 16:Er12<br>— Information display: U0166, U0181, U0184, U2516 | Yes | Repair the malfunctioning part by following the DTC inspection.<br>Go to the next step. |
| | | No | Troubleshooting completed. |
| 4 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Clear the DTC from the CAN system-related modules using the M-MDS.<br>• Start the engine.<br>• Are any of the CAN related DTCs displayed? | Yes | Go back to Step 3. |
| | | No | Troubleshooting completed. |
| 5 | **INSPECT COMMUNICATION CONDITION**<br>• Is there a response from the following modules?<br>— PCM<br>— TCM<br>— DSC HU/CM<br>— AWD control module<br>— BCM<br>— SAS control module<br>— Keyless control module<br>— Instrument cluster<br>— Audio amplifier<br>— Climate control unit<br>— Audio unit (base module)<br>— Car-navigation unit<br>— Information display | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 6 | **INSPECT MODULES THAT DO NOT RESPOND**<br>• Inspect the power supply and the ground circuit for any units that do not respond.<br>• Are they normal? | Yes | Go to the next step. |
| | | No | Repair the malfunctioning part, then go back to Step 1. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | **INSPECT CONNECTOR AND WIRING HARNESS BETWEEN MODULES THAT DO NOT RESPOND AND DLC-2**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect the wiring harness and connector between any module that does not respond and the DLC-2.<br>**PCM— DLC-2**<br>• 1AM— F<br>• 1AI— E<br>**TCM— DLC-2**<br>• A14— F<br>• A6— E<br>**DSC HU/CM— DLC-2**<br>• X— F<br>• W— E<br>**AWD control module— DLC-2**<br>• G— F<br>• H— E<br>**BCM— DLC-2**<br>• 3X, 5L— F<br>• 3W, 5I— E<br>**SAS control module— DLC-2**<br>• 2E— F<br>• 2F— E<br>**Keyless control module— DLC-2**<br>• 3X— F<br>• 3W— E<br>**Instrument cluster— DLC-2**<br>• 2R— F<br>• 2T— E<br>• 2V— L<br>• 2X— K<br>**Audio amplifier— DLC-2**<br>• 2O— L<br>• 2P— K<br>**Climate control unit— DLC-2**<br>• B— L<br>• A— K<br>**Audio unit— DLC-2**<br>• 1O— L<br>• 1Q— K<br>**Car-navigation unit— DLC-2**<br>• 1O— L<br>• 1Q— K<br>**Information display— DLC-2**<br>• J— L<br>• I— K<br>• Is there any malfunction? | Yes | Repair the malfunctioning part, then go back to Step 1. |
| | | No | Go to the next step. |
| 8 | **INSPECT WIRING HARNESS**<br>• Turn the ignition switch to the ON position (Engine off).<br>• Measure the voltage between the following terminals.<br>— DLC-2 terminals F and GND<br>— DLC-2 terminals E and GND<br>— DLC-2 terminals L and GND<br>— DLC-2 terminals K and GND<br>• Is the voltage **2.0— 3.0 V**? | Yes | Go to the next step. |
| | | No | Go to Step 13. |
| 9 | **INSPECT WIRING HARNESS**<br>• Turn the ignition switch to the LOCK position.<br>• Measure the resistance between the following terminals.<br>— DLC-2 terminals F and E<br>— DLC-2 terminals L and K<br>• Is the resistance **59— 65 ohms**? | Yes | Replace the modules that do not respond, then go back to Step 1. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | **INSPECT PCM**<br>• Disconnect the PCM connector.<br>• Measure the resistance between following terminals.<br>— PCM terminals 1AM and 1AI (part-side)<br>• Is the resistance **118— 130 ohms**? | Yes | Go to the next step. |
| | | No | Replace the PCM, then go to the next step. |
| 11 | **INSPECT INSTRUMENT CLUSTER**<br>• Disconnect the instrument cluster connector.<br>• Measure the resistance between the following terminals.<br>— Instrument cluster terminals 2R and 2T (part-side)<br>— Instrument cluster terminals 2V and 2X (part-side)<br>• Is the resistance **118— 130 ohms**? | Yes | Go to next step. |
| | | No | Replace the instrument cluster, then go to the next step. |
| 12 | **INSPECT INFORMATION DISPLAY**<br>• Disconnect the information display connector.<br>• Measure the resistance between the following terminals.<br>— Information display terminal J and I (part-side)<br>• Is the resistance **118— 130 ohms**? | Yes | Go to next step. |
| | | No | Replace the BCM, then go to the next step. |
| 13 | **CLASSIFY WIRING HARNESS MALFUNCTION OR MODULE MALFUNCTION**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the connector of any unit that does not respond. (If there are two or more units that do not respond, disconnect only one of the units.)<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage between the following terminals.<br>— DLC-2 terminals F and GND<br>— DLC-2 terminals E and GND<br>— DLC-2 terminals L and GND<br>— DLC-2 terminals K and GND<br>• Is voltage **2.0— 3.0 V**? | Yes | Go to the next step. |
| | | No | Retry this step with other module connector disconnected. If all units that do not respond are disconnected, go to Step 15. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 14 | **INSPECT WIRING HARNESS OF ANY UNIT THAT DOES NOT RESPOND**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect for continuity between the following connector terminals of any disconnected unit.<br>**PCM— DLC-2**<br>• 1AM— other terminals<br>• 1AI— other terminals<br>**TCM— DLC-2**<br>• A14— other terminals<br>• A6— other terminals<br>**DSC HU/CM— DLC-2**<br>• X— other terminals<br>• W— other terminals<br>**AWD control module— DLC-2**<br>• G— other terminals<br>• H— other terminals<br>**BCM— DLC-2**<br>• 3X, 5L— other terminals<br>• 3W, 5I— other terminals<br>**SAS control module— DLC-2**<br>• 2E— other terminals<br>• 2F— other terminals<br>**Keyless control module— DLC-2**<br>• 3X— other terminals<br>• 3W— other terminals<br>**Instrument cluster— DLC-2**<br>• 2R— other terminals<br>• 2T— other terminals<br>• 2V— other terminals<br>• 2X— other terminals<br>**Audio amplifier— DLC-2**<br>• 2O— other terminals<br>• 2P— other terminals<br>**Climate control unit— DLC-2**<br>• B— other terminals<br>• A— other terminals<br>**Audio unit— DLC-2**<br>• 1O— other terminals<br>• 1Q— other terminals<br>**Car-navigation unit— DLC-2**<br>• 1O— other terminals<br>• 1Q— other terminals<br>**Information display— DLC-2**<br>• J— other terminals<br>• I— other terminals<br>• Is there continuity? | Yes | Repair or replace the wiring harness, then go back to Step 1. |
| | | No | Replace the disconnected unit, then go back to Step 1. |
| 15 | **INSPECT CAN RELATED WIRING HARNESS**<br>• Inspect the related wiring harnesses (CAN_L and/or CAN_H) for the short circuit (to power supply or ground).<br>• Is the wiring harness normal? | Yes | Repair or replace the wiring harness, then go back to Step 1. |
| | | No | Go back to Step 1. |

## DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]

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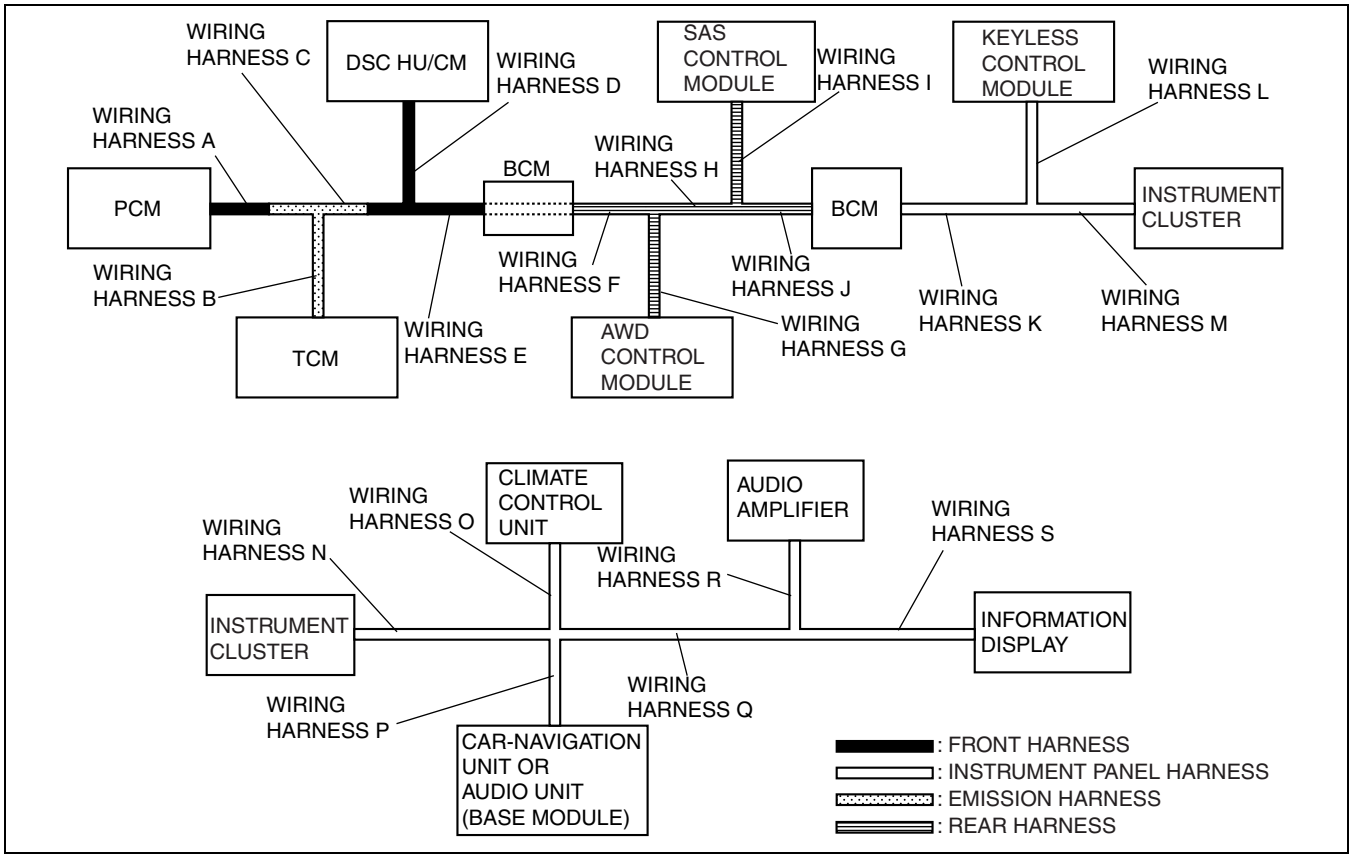
| DTC | Malfunction location | DTC output module | Page |
|---|---|---|---|
| U0073 | CAN system communication error | • PCM<br>• TCM<br>• DSC HU/CM<br>• AWD control module<br>• BCM<br>• SAS control module<br>• Keyless control module<br>• Instrument cluster | (See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0100 | Communication error to PCM | • TCM<br>• DSC HU/CM<br>• AWD control module<br>• Keyless control module<br>• Instrument cluster | (See 09-02D-8 PROCEDURES FOR DETERMINING THE LOCATION OF A MALFUNCTION[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0101 | Communication error to TCM | • PCM<br>• DSC HU/CM<br>• AWD control module<br>• Instrument cluster | |
| U0114 | Communication error to AWD control module | • DSC HU/CM<br>• Instrument cluster | |
| U0121 | Communication error to DSC HU/CM | • PCM<br>• TCM<br>• AWD control module<br>• Instrument cluster | |
| U0140 | Communication error to BCM | • DSC HU/CM<br>• Keyless control module<br>• Instrument cluster | |
| | Communication error to instrument cluster | TCM | |
| U0151 | Communication error to SAS control module | Instrument cluster | |
| U0155 | Communication error to instrument cluster | • PCM<br>• AWD control module<br>• SAS control module<br>• Climate control unit | |
| U0164 | Communication error to climate control unit | Instrument cluster | |
| U0166 | Communication error to climate control unit | Information display | |
| U0181 | Communication error to instrument cluster | Information display | |
| U0184 | Communication error to audio unit (base module) | Information display | |
| U0214 | Communication error to keyless control module | Instrument cluster | |
| U0323 | Communication error to instrument cluster | Keyless control module | |
| U0415 | Abnormal message from DSC HU/CM | TCM | |
| U0516 | CAN system communication error | Climate control unit | (See 09-02D-16 DTC U0516, U2516, 16:Er12[MULTIPLEX COMMUNICATION SYSTEM].) |
| U1900 | Communication error to other module | DSC HU/CM | (See 09-02D-8 PROCEDURES FOR DETERMINING THE LOCATION OF A MALFUNCTION[MULTIPLEX COMMUNICATION SYSTEM].) |
| U2023 | Abnormal message from PCM | • DSC HU/CM<br>• Keyless control module | |
| U2516 | CAN system communication error | • Instrument cluster<br>• Information display | (See 09-02D-16 DTC U0516, U2516, 16:Er12[MULTIPLEX COMMUNICATION SYSTEM].) |
| 16:Er12 | CAN system communication error | Audio unit (base module) | |

## PROCEDURES FOR DETERMINING THE LOCATION OF A MALFUNCTION[MULTIPLEX COMMUNICATION SYSTEM]

id0902e6830500

### System Wiring Diagram

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**PCM**

1. Inspect the display of DTC U0101, U0121 and/or U0155, using the M-MDS.
   (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | Malfunction location |
|---|---|---|---|---|
| | TCM | DSC HU/CM | Instrument cluster | |
| PCM | — | — | — | • Wiring harness A<br>• PCM |
| | — | × | × | • Wiring harness B<br>• TCM |
| | × | — | × | • Wiring harness D<br>• DSC HU/CM |
| | × | — | — | • Wiring harness C |
| | × | × | — | • Wiring harness E<br>• BCM<br>• Wiring harness F<br>• Wiring harness H<br>• Wiring harness J<br>• Wiring harness K<br>• Wiring harness M<br>• Instrument cluster |

**TCM**

1. Inspect the display of DTC U0100, U0121, U0140 and/or U0415 using the M-MDS. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | Malfunction location |
|---|---|---|---|---|
| | PCM | DSC HU/CM | Instrument cluster | |
| TCM | — | — | — | • Wiring harness B<br>• TCM |
| | — | × | × | • Wiring harness A<br>• PCM |
| | × | — | × | • Wiring harness D<br>• DSC HU/CM |
| | × | — | — | • Wiring harness C |
| | × | × | — | • Wiring harness E<br>• BCM<br>• Wiring harness F<br>• Wiring harness H<br>• Wiring harness J<br>• Wiring harness K<br>• Wiring harness M<br>• Instrument cluster |

**DSC HU/CM**

1. Inspect the display of DTC U0100, U0101, U0114, U0140, U1900 and/or U2023 using the M-MDS. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)

**Caution**
- **DTC U2023 may not be cleared during engine starting even if DTC clearing is done using the M-MDS. When clearing DTC U2023, execute with the ignition switch in the ON position (Engine off).**

**Note**
- You may want to check which unit is malfunctioning according to Freeze Frame Data. "Electrical" > "IC Service Function" > "Freeze Frame Data".This function is supported on IDS, not PDS.

2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | | Malfunction location |
|---|---|---|---|---|---|
| | PCM | TCM | AWD control module | BCM | |
| DSC HU/CM | — | — | — | — | • Wiring harness D<br>• DSC HU/CM |
| | — | × | × | × | • Wiring harness A<br>• PCM |
| | × | — | × | × | • Wiring harness B<br>• TCM |
| | — | — | × | × | • Wiring harness C |
| | × | × | — | × | • Wiring harness G<br>• AWD control module |
| | × | × | — | — | • Wiring harness E<br>• BCM<br>• Wiring harness F |
| | × | × | × | — | • Wiring harness H<br>• Wiring harness J<br>• BCM |

**AWD Control Module**

1. Inspect the display of DTC U0100, U0101, U0121 and/or U0155 using the M-MDS. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | | Malfunction location |
|---|---|---|---|---|---|
| | PCM | TCM | DSC HU/CM | Instrument cluster | |
| AWD Control Module | — | — | — | — | • Wiring harness G<br>• AWD Control Module |
| | — | × | × | × | • Wiring harness A<br>• PCM |
| | × | — | × | × | • Wiring harness B<br>• TCM |
| | — | — | × | × | • Wiring harness C |
| | × | × | — | × | • Wiring harness D<br>• DSC HU/CM |
| | — | — | — | × | • Wiring harness E<br>• BCM<br>• Wiring harness F |
| | × | × | × | — | • Wiring harness H<br>• Wiring harness J<br>• BCM<br>• Wiring harness K<br>• Wiring harness M<br>• Instrument cluster |

**BCM**

**Note**

- There is no DTC in the BCM that determines signal quality between it and the other module. Due to this, determine the malfunction location using the DTC on the other module side.

1. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | Malfunction location |
|---|---|---|---|---|
| | DSC HU/CM | Keyless control module | Instrument cluster | |
| BCM | — | — | — | • BCM |
| | — | × | × | • Wiring harness D<br>• Wiring harness E<br>• BCM<br>• Wiring harness F<br>• Wiring harness H<br>• Wiring harness J<br>• DSC HU/CM |
| | × | — | × | • Wiring harness L<br>• Keyless control module |
| | × | — | — | • Wiring harness K |
| | × | × | — | • Wiring harness M<br>• Instrument cluster |

**SAS Control Module**

1. Inspect the display of DTC U0155 using the M-MDS.
   (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | Malfunction location |
|---|---|---|
| | Instrument cluster | |
| SAS control module | — | • SAS control module<br>• Wiring harness I<br>• Wiring harness J<br>• BCM<br>• Wiring harness K<br>• Wiring harness M<br>• Instrument cluster |

**Keyless Control Module**

1. Inspect the display of DTC U0100, U0140, U0323 and/or U2023 using the M-MDS.
   (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)

**Caution**
- **DTC U2023 may not be cleared during engine starting even if DTC clearing is done using the M-MDS. When clearing DTC U2023, execute with the ignition switch in the ON position (Engine off).**

**Note**
- You may want to check which unit is malfunctioning according to Freeze Frame Data. "Electrical" > "IC Service Function" > "Freeze Frame Data".This function is supported on IDS, not PDS.

2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | Malfunction location |
|---|---|---|---|---|
| | PCM | BCM | Instrument cluster | |
| Keyless control module | — | — | — | • Wiring harness L<br>• Keyless control module |
| | — | × | × | • Wiring harness A<br>• Wiring harness C<br>• Wiring harness E<br>• BCM<br>• Wiring harness F<br>• Wiring harness H<br>• Wiring harness J<br>• PCM |
| | — | — | × | • Wiring harness K<br>• BCM |
| | × | — | × | • BCM |
| | × | × | — | • Wiring harness M<br>• Instrument cluster |

**Instrument Cluster**

1. Inspect the display of DTC U0100, U0101, U0114, U0121, U0140, U0151 and/or U0214 using the M-MDS. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | | | | | Malfunction location |
|---|---|---|---|---|---|---|---|---|
| | PCM | TCM | DSC HU/ CM | AWD control module | SAS control module | BCM | Keyless control module | |
| Instrument cluster | — | — | — | — | — | — | — | • Wiring harness M<br>• Instrument cluster |
| | — | × | × | × | × | × | × | • Wiring harness A<br>• PCM |
| | — | — | × | × | × | × | × | • Wiring harness C |
| | × | — | × | × | × | × | × | • Wiring harness B<br>• TCM |
| | — | — | — | × | × | × | × | • Wiring harness E<br>• BCM<br>• Wiring harness F |
| | × | × | — | × | × | × | × | • Wiring harness D<br>• DSC HU/CM |
| | — | — | — | — | × | × | × | • Wiring harness H |
| | × | × | × | — | × | × | × | • Wiring harness G<br>• AWD control module |
| | — | — | — | — | — | × | × | • Wiring harness J<br>• BCM |
| | × | × | × | × | — | × | × | • Wiring harness I<br>• SAS control module |
| | — | — | — | — | — | — | × | • Wiring harness K<br>• BCM |
| | × | × | × | × | × | — | × | • BCM |
| | × | × | × | × | × | × | — | • Wiring harness L<br>• Keyless control module |

**Note**

- There is no DTC in the instrument cluster that determines signal quality between it and the information display. Due to this, determine the malfunction location using the DTC on the information display.

3. Inspect the display of DTC U0164 using the M-MDS. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
4. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | Malfunction location |
|---|---|---|---|
| | Climate control unit | Information display | |
| Instrument cluster | — | — | • Wiring harness N<br>• Instrument cluster |
| | — | × | • Wiring harness O<br>• Climate control unit |
| | × | — | • Wiring harness Q<br>• Wiring harness S<br>• Information display |

**Climate Control Unit**

**Note**
- There is no DTC in the climate control unit that determines signal quality between it and the information display. Due to this, determine the malfunction location using the DTC on the information display.

1. Inspect the display of DTC U0155 using the M-MDS. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | Malfunction location |
|---|---|---|---|
| | Instrument cluster | Information display | |
| Climate control unit | — | — | • Wiring harness O<br>• Climate control unit |
| | — | × | • Wiring harness N<br>• Instrument cluster |
| | × | — | • Wiring harness Q<br>• Wiring harness S<br>• Information display |

**Car- navigation Unit/Audio Unit (Base Module)**

**Note**
- There is no DTC in the car-navigation unit/audio unit (base module) that determines signal quality between it and the information display. Due to this, determine the malfunction location using the DTC on the information display.

1. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | Malfunction location |
|---|---|---|
| | Information display | |
| Car-navigation unit<br>Audio unit (base module) | — | • Wiring harness P<br>• Wiring harness Q<br>• Wiring harness S<br>• Car-navigation unit<br>• Audio unit (base module)<br>• Information display |

**Information display**
1. Inspect the display of DTC U0166, U0181 and/or U0184 using the input/output check mode. (See 09-22-15 INFORMATION DISPLAY INPUT/OUTPUT CHECK MODE.)
2. Referring to the following table, determine the malfunctioning part of the CAN system.

×: Normal
— : Communication error

| Module | Communication status | | | Malfunction location |
|---|---|---|---|---|
| | Climate control unit | Car-navigation unit<br>Audio unit (base module) | Instrument cluster | |
| Information display | — | — | — | • Wiring harness Q<br>• Wiring harness S<br>• Information display |
| | — | × | × | • Wiring harness O<br>• Climate control unit |
| | × | — | × | • Wiring harness P<br>• Car-navigation unit<br>• Audio unit (base module) |
| | × | × | — | • Wiring harness N<br>• Instrument cluster |

**Repair Procedure**

1. Inspect the connector of malfunctioning module.
   - If there is any malfunction, repair or replace the connector.
2. Inspect the malfunctioning wiring harnesses as follow:
   - If there is any malfunction, repair or replace the wiring harnesses.
   - If there is no malfunction, replace the malfunctioning module.
     — Short to GND
     — Short to power supply
     — Twisted pair short each other
     — Open circuit
3. Make sure to reconnect all disconnected connectors.
4. Clear the CAN system related DTCs using the M-MDS.
5. Verify if the CAN system related DTCs are displayed using the M-MDS.
   - If the same following DTCs are present, replace the malfunctioning module.
     — U0073 (PCM, TCM, DSC HU/CM, AWD control module, BCM, SAS control module, keyless control module, instrument cluster)
     — U0516 (Climate control unit)
     — U2516 (Instrument cluster, information display)
     — 16:Er12 (Audio unit (base module))
   - If other DTC is present, perform the appropriate DTC inspection. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM].)

**DTC U0073[MULTIPLEX COMMUNICATION SYSTEM]**

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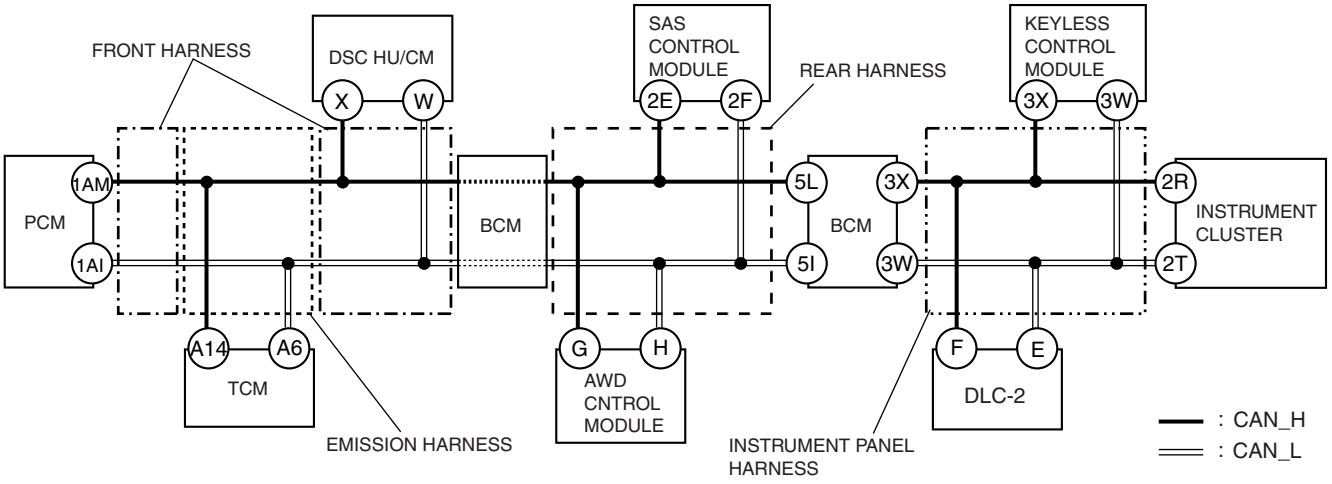
| | | | |
|---|---|---|---|
| **DTC** | **U0073** | **PCM<br>TCM<br>DSC HU/CM<br>AWD control module<br>BCM<br>SAS control module<br>Keyless control module<br>Instrument cluster** | **CAN system communication error** |
| **DETECTION CONDITION** | | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only detection conditions may cause injury due to operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br><br>• CAN system related harness malfunction<br>• Related module communication error | |
| **POSSIBLE CAUSE** | | • Open or short circuit in wiring harness<br>• Malfunction of connectors between PCM, TCM, DSC HU/CM, AWD control module, BCM, SAS control module, keyless control module, instrument cluster<br>• PCM malfunction<br>• TCM malfunction<br>• DSC HU/CM malfunction<br>• AWD control module malfunction<br>• BCM malfunction<br>• SAS control module malfunction<br>• Keyless control module malfunction<br>• Instrument cluster malfunction | |

| | | | |
|---|---|---|---|
| **DTC** | **U0073** | **PCM<br>TCM<br>DSC HU/CM<br>AWD control module<br>BCM<br>SAS control module<br>Keyless control module<br>Instrument cluster** | **CAN system communication error** |




**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT CAN SYSTEM-RELATED DTC**<br>• Are any DTCs other than the following displayed?<br>— U0073 | Yes | Determine malfunctioning part in CAN system.<br>(See 09-02D-8 PROCEDURES FOR DETERMINING THE LOCATION OF A MALFUNCTION[MULTIPLEX COMMUNICATION SYSTEM]) |
| | | No | Go to the next step. |
| 2 | **INSPECT CONNECTOR**<br>• Inspect the connector of the module that outputs the DTC.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace the connector, then go to Step 4. |
| 3 | **INSPECT WIRING HARNESSES**<br>• Inspect for the following malfunctioning wiring harnesses:<br>— Short to GND<br>— Short to power supply<br>— Twisted pair short each other<br>— Open circuit<br>• Is there any malfunction? | Yes | Repair or replace the wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 4 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC using the M-MDS.<br>• Is the same DTC present? | Yes | Replace the module that outputs the DTC, then retry this step. |
| | | No | Troubleshooting completed. |

## DTC U0516, U2516, 16:Er12[MULTIPLEX COMMUNICATION SYSTEM]

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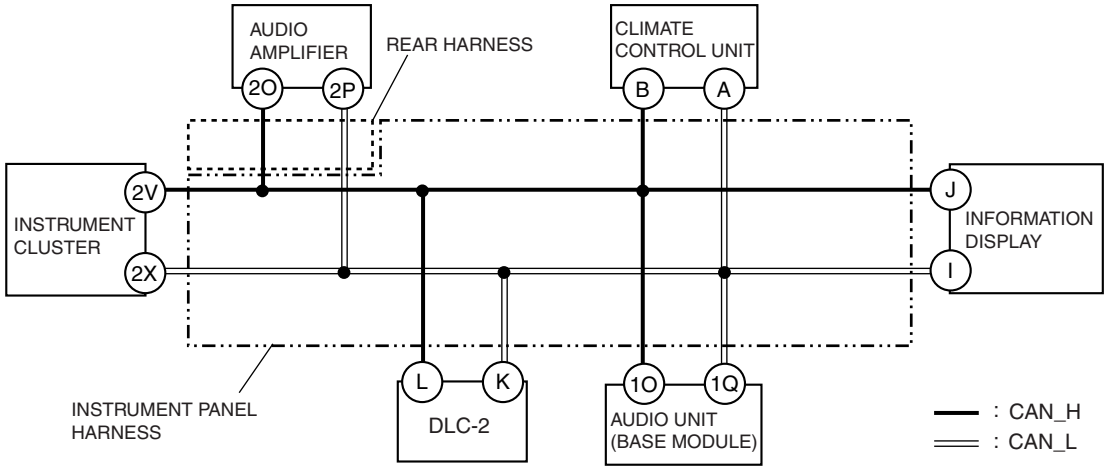
| | | | |
|---|---|---|---|
| DTC | U0516 | Climate control unit | CAN system communication error |
| | U2516 | Information display<br>Instrument cluster | |
| | 16:Er12 | Audio unit (base module) | |
| DETECTION CONDITION | **Warning**<br>• **Detection conditions are for understanding the DTC outline before performing an inspection. Performing an inspection according to only detection conditions may cause injury due to operating error, or damage the system. When performing an inspection, always follow the inspection procedure.**<br>• CAN system related harness malfunction<br>• Related module communication error | | |
| POSSIBLE CAUSE | • Open or short circuit in wiring harness<br>• Malfunction of connectors between information display, audio unit (base module), climate control unit and instrument cluster<br>• Climate control unit malfunction<br>• Information display malfunction<br>• Audio unit (base module) malfunction<br>• Instrument cluster malfunction | | |




### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT CAN SYSTEM-RELATED DTC**<br>• Are any DTCs other than the following displayed?<br>— U0516<br>— U2516<br>— 16:Er12 | Yes | Determine malfunctioning part in CAN system. (See 09-02D-8 PROCEDURES FOR DETERMINING THE LOCATION OF A MALFUNCTION[MULTIPLEX COMMUNICATION SYSTEM].) |
| | | No | Go to the next step. |
| 2 | **INSPECT CONNECTOR**<br>• Inspect the connector of the module that outputs the DTC.<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Repair or replace the connector, then go to Step 4. |
| 3 | **INSPECT WIRING HARNESSES**<br>• Inspect for the following malfunctioning wiring harnesses:<br>— Short to GND<br>— Short to power supply<br>— Twisted pair short each other<br>— Open circuit<br>• Is there any malfunction? | Yes | Repair or replace the wiring harness, then go to the next step. |
| | | No | Go to the next step. |
| 4 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC using the M-MDS.<br>• Is the same DTC present? | Yes | Replace the module that outputs the DTC, then retry this step. |
| | | No | Troubleshooting completed. |

# 09-02E ON-BOARD DIAGNOSTIC [INSTRUMENT CLUSTER]

**DTC INSPECTION**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–1**
**DTC TABLE**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–1**
**DTC B1202**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–2**
**DTC B1204**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–3**
**DTC B1342**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–5**
**DTC B2477**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–5**
**DTC U2064**
**[INSTRUMENT CLUSTER] . . . . . 09-02E–6**
Diagnostic Procedure . . . . . 09-02E–6

## DTC INSPECTION[INSTRUMENT CLUSTER]

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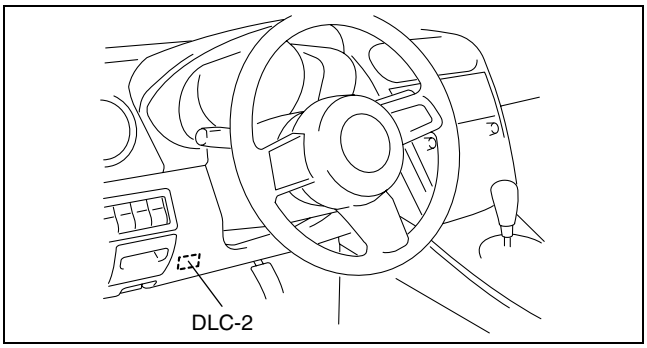
1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   **When using the IDS (notebook PC)**
   - Select the “Toolbox” tab.
   - Select “Self Test”.
   - Select “Module”.
   - Select “HEC”.

   **When using the PDS (pocket PC)**
   - Select “Module Tests”.
   - Select “HEC”.
   - Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the instrument cluster.

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09-02E

## DTC TABLE[INSTRUMENT CLUSTER]

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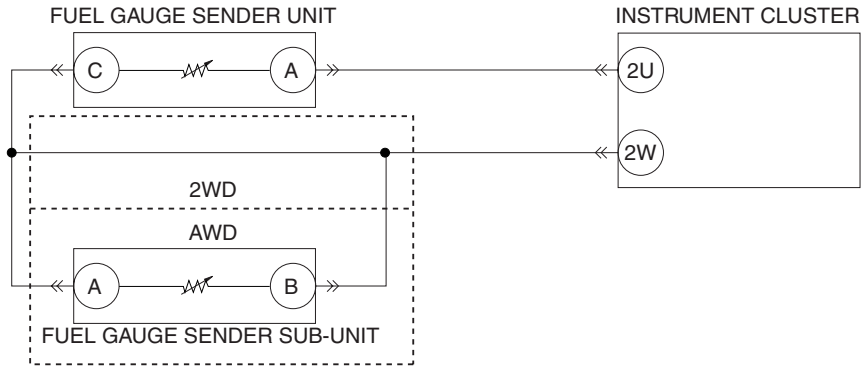
| DTC | Malfunction location | Freeze frame data | Page |
|---|---|---|---|
| B1202 | Fuel gauge sender unit circuit malfunction (open circuit) | — | (See 09-02E-2 DTC B1202[INSTRUMENT CLUSTER].) |
| B1204 | Fuel gauge sender unit circuit malfunction (short to GND) | — | (See 09-02E-3 DTC B1204[INSTRUMENT CLUSTER].) |
| B1342 | Instrument cluster malfunction | — | (See 09-02E-5 DTC B1342[INSTRUMENT CLUSTER].) |
| B2477 | Configuration error | — | (See 09-02E-5 DTC B2477[INSTRUMENT CLUSTER].) |
| U0073 | CAN system communication error | — | (See 09-02D-2 MULTIPLEX COMMUNICATION SYSTEM[MULTIPLEX COMMUNICATION SYSTEM].) |
| U0100 | Communication error to PCM | × | |
| U0101 | Communication error to TCM | × | |
| U0114 | Communication error to AWD control module | × | |
| U0121 | Communication error to DSC HU/CM | × | |
| U0140 | Communication error to BCM | × | |
| U0151 | Communication error to SAS control module | × | |
| U0214 | Communication error to keyless control module | × | |
| U2023 | Abnormal message from other module | × | |
| U2064 | Warning light illumination request signal from other modules | × | (See 09-02E-6 DTC U2064[INSTRUMENT CLUSTER].) |

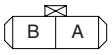
## DTC B1202[INSTRUMENT CLUSTER]

id0902e8840200

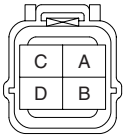
| DTC B1202 | Fuel gauge sender unit circuit malfunction (open circuit) |
|---|---|
| DETECTION CONDITION | • The resistance between instrument cluster and fuel gauge sender unit is **more than 600 ohms** for **5 s**. |
| POSSIBLE CAUSE | • Open circuit in wiring harness between instrument cluster and fuel gauge sender unit<br>• Fuel gauge sender unit malfunction<br>• Instrument cluster malfunction |



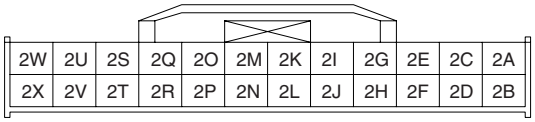

FUEL GAUGE SENDER SUB-UNIT WIRING HARNESS-SIDE CONNECTOR

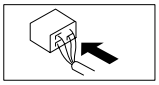



FUEL GAUGE SENDER UNIT WIRING HARNESS-SIDE CONNECTOR




INSTRUMENT CLUSTER WIRING HARNESS-SIDE CONNECTOR



### Diagnostic procedure

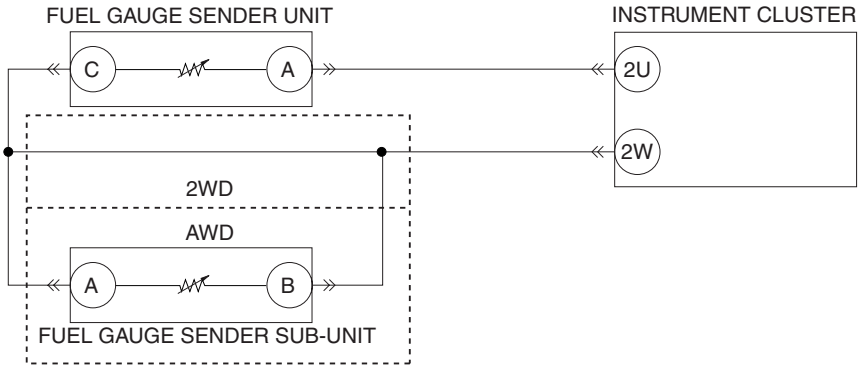
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FUEL GAUGE**<br>• Perform the check code 23 inspection.<br>• Is there any malfunction? | Yes | Replace the instrument cluster. |
| | | No | Go to the next step. |
| 2 | **INSPECT INSTRUMENT CLUSTER CONNECTOR**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the instrument cluster connector.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL GAUGE SENDER UNIT CONNECTOR**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the fuel gauge sender unit and fuel gauge sender sub-unit connectors.<br>• Inspect the fuel gauge sender unit and fuel gauge sender sub-unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT WIRING HARNESS**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect for continuity between following terminals:<br>**2WD**<br>— Instrument cluster terminal 2U — fuel gauge sender unit terminal A (wiring harness-side)<br>— Instrument cluster terminal 2W — fuel gauge sender unit terminal C (wiring harness-side)<br>**AWD**<br>— Instrument cluster terminal 2U — fuel gauge sender unit terminal A (wiring harness-side)<br>— Fuel gauge sender unit terminal C — fuel gauge sender sub-unit terminal A (wiring harness-side)<br>— Instrument cluster terminal 2W — fuel gauge sender sub-unit terminal B (wiring harness-side)<br>• Is there continuity? | Yes | Inspect the fuel gauge sender unit and fuel gauge sender sub-unit (AWD).<br>• Repair or replace if necessary. |
| | | No | Repair or replace the wiring harness. |

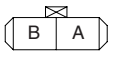
## DTC B1204[INSTRUMENT CLUSTER]

id0902e8840300

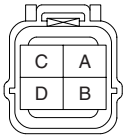
| DTC B1204 | Fuel gauge sender unit circuit malfunction (short to GND) |
|---|---|
| DETECTION CONDITION | • The resistance between instrument cluster and fuel gauge sender unit is **less than 6 ohms** for **5 s**. |
| POSSIBLE CAUSE | • Short to GND in wiring harness between instrument cluster and fuel gauge sender unit<br>• Wiring harness between instrument cluster and fuel gauge sender unit short each other<br>• Fuel gauge sender unit malfunction<br>• Instrument cluster malfunction |



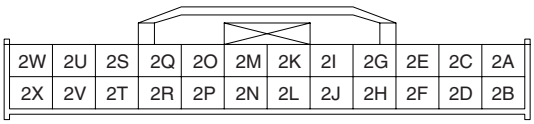

FUEL GAUGE SENDER SUB-UNIT WIRING HARNESS-SIDE CONNECTOR

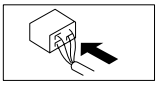



FUEL GAUGE SENDER UNIT WIRING HARNESS-SIDE CONNECTOR




INSTRUMENT CLUSTER WIRING HARNESS-SIDE CONNECTOR



09-02E

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FUEL GAUGE**<br>• Perform the check code 23 inspection.<br>• Is there any malfunction? | Yes | Replace the instrument cluster. |
| | | No | Go to the next step. |
| 2 | **INSPECT INSTRUMENT CLUSTER CONNECTOR**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the instrument cluster connector.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part. |
| | | No | Go to the next step. |
| 3 | **INSPECT FUEL GAUGE SENDER UNIT CONNECTOR**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the fuel gauge sender unit and fuel gauge sender sub-unit connectors.<br>• Inspect the fuel gauge sender unit and fuel gauge sender sub-unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the malfunctioning part. |
| | | No | Go to the next step. |
| 4 | **INSPECT WIRING HARNESS**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect for continuity between following terminals:<br>**2WD**<br>— Instrument cluster terminal 2U (wiring harness-side) — body GND<br>— Instrument cluster terminal 2W (wiring harness-side) — body GND<br>**AWD**<br>— Instrument cluster terminal 2U (wiring harness-side) — body GND<br>— Instrument cluster terminal 2W (wiring harness-side) — body GND<br>— Fuel gauge sender unit terminal C (wiring harness-side) — body GND<br>• Is there continuity? | Yes | Repair or replace the wiring harness. |
| | | No | Go to the next step. |
| 5 | **INSPECT WIRING HARNESS**<br>• Turn the ignition switch to the LOCK position.<br>• Inspect for continuity between following terminals:<br>**2WD**<br>— Instrument cluster terminal 2U — instrument cluster terminal 2W (wiring harness-side)<br>**AWD**<br>— Instrument cluster terminal 2U — instrument cluster terminal 2W (wiring harness-side)<br>— Fuel gauge sender unit terminal A — fuel gauge sender unit terminal C (wiring harness-side)<br>— Fuel gauge sender sub-unit terminal A — fuel gauge sender sub-unit terminal B (wiring harness-side)<br>• Is there continuity? | Yes | Repair or replace the wiring harness. |
| | | No | Inspect the fuel gauge sender unit and fuel gauge sender sub-unit (AWD).<br>• Repair or replace if necessary. |

### DTC B1342[INSTRUMENT CLUSTER]

id0902e8840400

| | |
|---|---|
| **DTC B1342** | • **Instrument cluster malfunction** |
| **DETECTION CONDITION** | • Malfunction in the instrument cluster internal circuit |
| **POSSIBLE CAUSE** | • Instrument cluster malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT INSTRUMENT CLUSTER**<br>• Clear the DTC from the memory.<br>• Turn the ignition switch to the LOCK position.<br>• Turn the ignition switch to the ON position.<br>• Is B1342 displayed? | Yes | Replace the instrument cluster. |
| | | No | DTC troubleshooting completed. |

### DTC B2477[INSTRUMENT CLUSTER]

id0902e8840500

| | |
|---|---|
| **DTC B2477** | • **Configuration error** |
| **DETECTION CONDITION** | • Configuration error<br>• Malfunction in the instrument cluster internal circuit |
| **POSSIBLE CAUSE** | • Instrument cluster malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **PERFORM INSTRUMENT CLUSTER CONFIGURATION**<br>• Perform instrument cluster configuration.<br>• Is B2477 displayed? | Yes | Replace the instrument cluster. |
| | | No | Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING OF DTC B2477 COMPLETED**<br>• Clear the DTC from the memory.<br>• Is B2477 displayed? | Yes | Go to the applicable DTC inspection. |
| | | No | DTC troubleshooting completed. |

## DTC U2064[INSTRUMENT CLUSTER]

id0902e8840600

| DTC U2064 | Warning light illumination request signal from other modules |
|---|---|
| DETECTION CONDITION | • Receive warning light illumination request signal |
| POSSIBLE CAUSE | • CAN-related module malfunction |

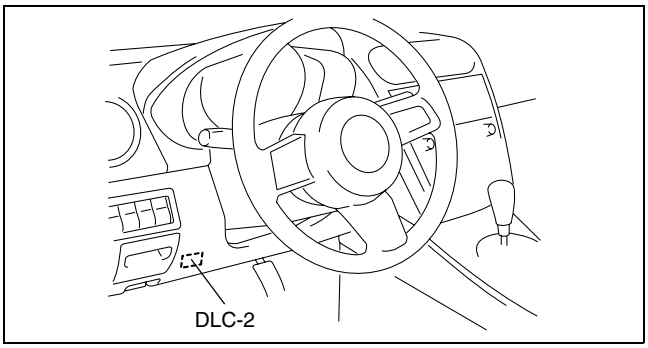
**Caution**
- **DTC U2064 is registered to the instrument cluster by a request from other modules and does not indicate a malfunction in the instrument cluster itself.**
- **DTC U2064 may not be cleared during engine starting even if DTC clearing is done using the M-MDS. When clearing DTC U2064, execute with the ignition switch in the ON position (Engine off).**

**Diagnostic Procedure**

1. Verify the freeze frame data.
   (1) Connect the IDS (laptop PC) to the DLC-2.

   **Note**
   - Freeze frame data of the instrument cluster can be displayed by the IDS (laptop PC)

   (2) After set up the IDS (laptop PC) (including the vehicle recognition), the following can be selected from the IDS (laptop PC) screen.
   - Select the "Toolbox" tab.
   - Select "Electrical".
   - Select "IC Service Functions".
   - Select "Freeze Frame Data".



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2. Determine which unit is thought to be malfunctioning based on the freeze frame data.

   **Note**
   - If several warning light illumination requests are received, they will be recorded in one freeze frame data.

| Freeze frame data | | Warning light illumination request unit | | | | | |
|---|---|---|---|---|---|---|---|
| | | PCM | TCM | DSC HU/ CM | Keyless control module | AWD control module | SAS control module |
| Illuminated warning light | Air bag system warning light | — | — | — | — | — | × |
| | Generator warning light | × | — | — | — | — | — |
| | MIL | × | — | — | — | — | — |
| | Oil pressure warning light | — | — | — | — | — | — |
| | DSC/TCS indicator light | — | — | — | — | — | — |
| | ABS warning light | — | — | × | — | — | — |
| | Brake system warning light | — | — | × | — | — | — |
| | AT warning light | — | × | — | — | — | — |
| | AWD warning light | — | — | — | — | × | — |
| | Keyless warning light | — | — | — | × | — | — |
| Meter, gauge control status | Speedometer | — | — | — | — | — | — |
| | Tachometer | — | — | — | — | — | — |
| | Water temperature gauge | — | — | — | — | — | — |

3. Inspect the malfunctioning part.
   - Repair or replace if necessary.
4. Clear the DTC from the memory.
5. Turn the ignition switch to the LOCK position.
6. Turn the ignition switch to the ON position.
7. Verify that the DTC U2064 is displayed using the M-MDS.
   - If DTC U2064 is displayed, go back to Step 1.

# 09-02F ON-BOARD DIAGNOSTIC [BCM]


DTC INSPECTION[BCM] . . . . . 09-02F–1
DTC TABLE[BCM] . . . . . 09-02F–2
DTC B1317[BCM] . . . . . 09-02F–3
DTC B1318[BCM] . . . . . 09-02F–4
DTC B1322[BCM] . . . . . 09-02F–6
DTC B1330[BCM] . . . . . 09-02F–7
DTC B1342[BCM] . . . . . 09-02F–8
DTC B1502[BCM] . . . . . 09-02F–9
DTC B1506[BCM] . . . . . 09-02F–10
DTC B1614[BCM] . . . . . 09-02F–11
DTC B1520[BCM] . . . . . 09-02F–12
DTC B1566[BCM] . . . . . 09-02F–14
DTC B1873[BCM] . . . . . 09-02F–15
DTC B2175[BCM] . . . . . 09-02F–16
DTC B2218[BCM] . . . . . 09-02F–17
DTC B2574[BCM] . . . . . 09-02F–18
DTC B2721[BCM] . . . . . 09-02F–20
DTC B2982[BCM] . . . . . 09-02F–21
DTC C1189[BCM] . . . . . 09-02F–22
DTC C1284[BCM] . . . . . 09-02F–23
DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM] . . . . . 09-02F–24
DTC C1937[BCM] . . . . . 09-02F–26
BCM SELF-TEST[BCM] . . . . . 09-02F–26


## DTC INSPECTION[BCM]

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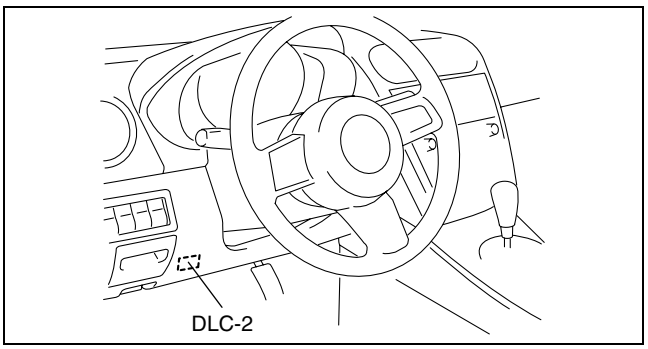


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1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   **When using the IDS (notebook PC)**
   - Select the “Toolbox” tab.
   - Select “Self Test”.
   - Select “Module”.
   - Select “GEM”.

   **When using the PDS (pocket PC)**
   - Select “Module Tests”.
   - Select “GEM”.
   - Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the BCM.

## DTC TABLE[BCM]

id0902f5839500

### DTC table

| DTC No. | Description | Detection condition | Page |
|---|---|---|---|
| B1317 | Battery voltage high | Input voltage from the battery is excessively high | (See 09-02F-3 DTC B1317[BCM].) |
| B1318 | Battery voltage low | Input voltage from the battery is excessively low | (See 09-02F-4 DTC B1318[BCM].) |
| B1322 | Driver door ajar circuit short to ground | Short to GND in wiring harness between BCM and front door switch (driver-side) | (See 09-02F-6 DTC B1322[BCM].) |
| B1330 | Passenger door ajar circuit short to ground | Short to GND in wiring harness between BCM and front door latch switch (passenger-side) | (See 09-02F-7 DTC B1330[BCM].) |
| B1342 | ECU is faulted | BCM microcomputer malfunction | (See 09-02F-8 DTC B1342[BCM].) |
| B1502 | Turn signal left circuit short to ground | Short to GND in wiring harness between BCM and turn switch (LH) | (See 09-02F-9 DTC B1502[BCM].) |
| B1506 | Turn signal right circuit short to ground | Short to GND in wiring harness between BCM and turn switch (RH) | (See 09-02F-10 DTC B1506[BCM].) |
| B1520 | Hood switch circuit open | Open circuit in wiring harness between BCM and hood latch switch | (See 09-02F-12 DTC B1520[BCM].) |
| B1566 | Door ajar circuit short to ground | Short to GND in wiring harness between BCM and rear door switches | (See 09-02F-14 DTC B1566[BCM].) |
| B1614 | Rear wiper interval switch input circuit short to ground | Short to GND in wiring harness between BCM and rear wiper and washer switch (INT) | (See 09-02F-11 DTC B1614[BCM].) |
| B1873 | Hazard switch input circuit short to ground | Short to GND in wiring harness between BCM and hazard warning switch | (See 09-02F-15 DTC B1873[BCM].) |
| B2175 | A/C request switch circuit short to ground | Short to GND in wiring harness between BCM and climate control unit (A/C ON request) | (See 09-02F-16 DTC B2175[BCM].) |
| B2218 | Door lock switch circuit short to ground | Short to GND in wiring harness between BCM and door lock switches | (See 09-02F-17 DTC B2218[BCM].) |
| B2574 | Driver door lock switch short to ground | Short to GND in wiring harness between BCM and driver-side door lock-link switch | (See 09-02F-18 DTC B2574[BCM].) |
| B2721 | Liftgate ajar output short to ground | Short to GND in wiring harness between BCM and liftgate latch switch | (See 09-02F-20 DTC B2721[BCM].) |
| B2982 | Park brake switch circuit open | Open circuit in wiring harness between BCM and parking brake switch | (See 09-02F-21 DTC B2982[BCM].) |
| C1189 | Brake fluid level sensor input short to ground | Short to GND in wiring harness between BCM and brake fluid level sensor | (See 09-02F-22 DTC C1189[BCM].) |
| C1284 | Oil pressure switch circuit failure | Open circuit in wiring harness between BCM and oil pressure switch | (See 09-02F-23 DTC C1284[BCM].) |
| C1295 | Steering wheel angle sensor internal fault | BCM detects steering angle sensor internal abnormality (signal overflow) | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C1307 | Steering wheel angle sensor encoder ring defective | BCM detects steering angle sensor internal abnormality (signal jump) | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C1441 | Steering phase A circuit signal is not sensed | Open circuit in wiring harness between BCM and steering angle sensor | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C1442 | Steering phase B circuit signal is not sensed | Open circuit in wiring harness between BCM and steering angle sensor | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C144C | Steering phase C circuit signal is not sensed | Open circuit in wiring harness between BCM and steering angle sensor | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C1443 | Steering phase A circuit short to ground | Short to GND in wiring harness between BCM and steering angle sensor | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C1444 | Steering phase B circuit short to ground | Short to GND in wiring harness between BCM and steering angle sensor | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |

| DTC No. | Description | Detection condition | Page |
|---|---|---|---|
| C144A | Steering phase C circuit short to ground | Short to GND in wiring harness between BCM and steering angle sensor | (See 09-02F-24 DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM].) |
| C1937 | Steering wheel angle sensor offset failure | BCM lost steering angle initialization position | (See 09-02F-26 DTC C1937[BCM].) |
| U0073 | CAN system communication error | BCM or twisted pair malfunction | (See 09-02D-14 DTC U0073[MULTIPLEX COMMUNICATION SYSTEM].) |

### DTC B1317[BCM]

id0902f5830900

| DTC B1317 | Battery voltage high |
|---|---|
| DETECTION CONDITION | Input voltage from the battery is excessively high |
| POSSIBLE CAUSE | • Battery malfunction<br>• Generator malfunction<br>• BCM malfunction |

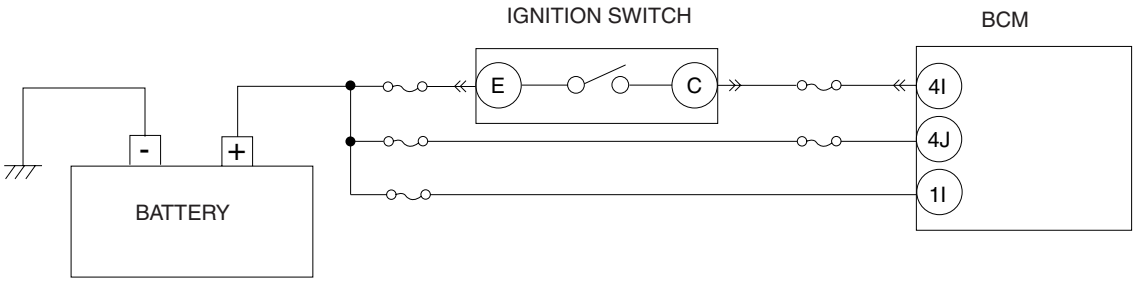
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DTC FROM PCM**<br>• Connect the M-MDS to the DLC-2.<br>• Are any DTCs from the PCM displayed? | Yes | Perform DTC inspection.<br>(See 01-02-13 DTC TABLE[L3 WITH TC].)<br>Go to the next step. |
| | | No | Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Turn the ignition switch to LOCK position then ON position.<br>• Is the same DTC present? | Yes | Replace the BCM.<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

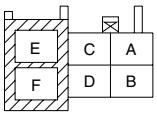
## DTC B1318[BCM]

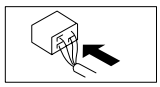
id0902f5831000

| DTC B1318 | Battery voltage low |
|---|---|
| DETECTION CONDITION | Input voltage from the battery is excessively low |
| POSSIBLE CAUSE | • Open circuit in wiring harness between BCM terminal 4I and battery<br>• Open circuit in wiring harness between BCM terminal 4J and battery<br>• Open circuit in wiring harness between BCM terminal 1I and battery<br>• Short to GND in wiring harness between BCM terminal 4I and battery<br>• Short to GND in wiring harness between BCM terminal 4J and battery<br>• Short to GND in wiring harness between BCM terminal 1I and battery<br>• Battery malfunction<br>• Generator malfunction<br>• BCM malfunction |

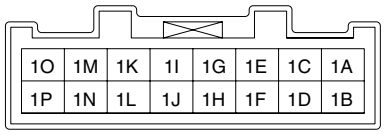


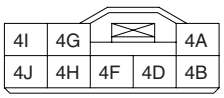

IGNITION SWITCH WIRING HARNESS-SIDE CONNECTOR

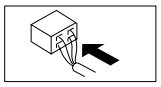


BCM WIRING HARNESS-SIDE CONNECTOR



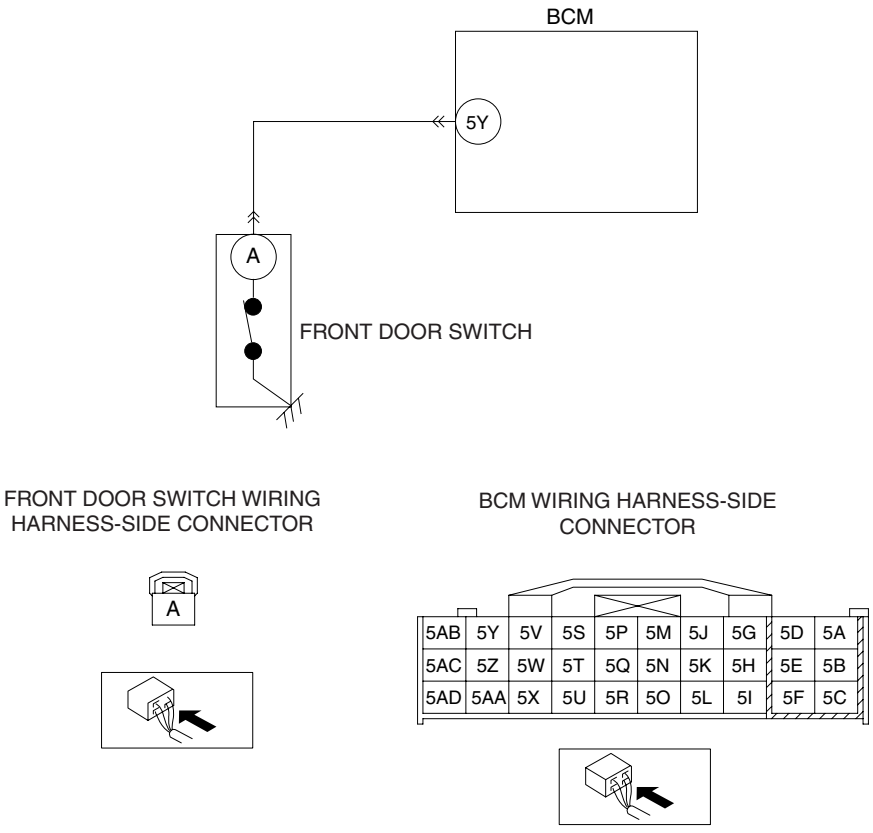
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DTC FROM PCM**<br>• Connect the M-MDS to the DLC-2.<br>• Are any DTCs from the PCM displayed? | Yes | Perform DTC inspection.<br>(See 01-02-13 DTC TABLE[L3 WITH TC].)<br>Go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT BCM POWER SUPPLY CIRCUIT FOR OPEN CIRCUIT**<br>• Disconnect the negative battery cable.<br>• Disconnect the positive battery cable.<br>• Turn the ignition switch to ON.<br>• Inspect for continuity between following terminals:<br>— BCM terminal 4I (wiring harness-side) — battery positive terminal (wiring harness-side)<br>— BCM terminal 4J (wiring harness-side) — battery positive terminal (wiring harness-side)<br>— BCM terminal 1I (wiring harness-side) — battery positive terminal (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to Step 5. |
| 4 | **INSPECT BCM POWER SUPPLY CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between following terminals:<br>— BCM terminal 4I (wiring harness-side) — body GND<br>— BCM terminal 4J (wiring harness-side) — body GND<br>— BCM terminal 1I (wiring harness-side) — body GND<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Turn the ignition switch to LOCK position then ON position.<br>• Is the same DTC present? | Yes | Replace the BCM.<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1322[BCM]

id0902f5838000

| DTC B1322 | Drive door ajar circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and front door switch (driver-side) |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 5Y and front door switch (driver-side) terminal G<br>• Front door switch malfunction<br>• BCM malfunction |




### Diagnostic procedure

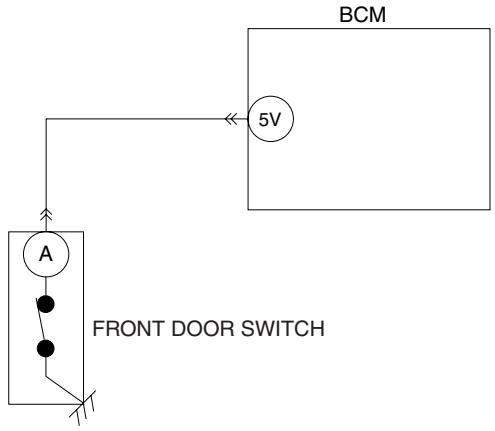
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FRONT DOOR SWITCH (DRIVER-SIDE) CONNECTOR**<br>• Turn the ignition switch off.<br>• Disconnect the front door switch (driver-side) connector.<br>• Inspect the front door switch (driver-side) connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT FRONT DOOR SWITCH (DRIVER-SIDE) SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 5Y (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible open circuit, then go to Step 5. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **INSPECT FRONT DOOR LATCH AND LOCK ACTUATOR (DRIVER-SIDE)**<br>• Inspect the front door switch (driver-side). (See 09-14-6 FRONT DOOR LATCH AND LOCK ACTUATOR INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the front door switch (driver-side), then go to the next step. (See 09-14-5 FRONT DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

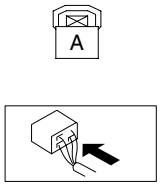
### DTC B1330[BCM]

id0902f5838100

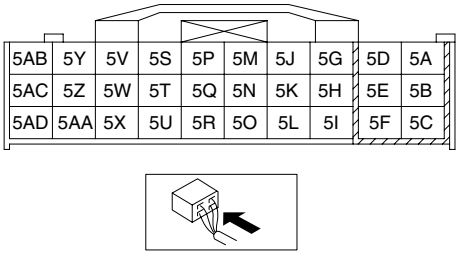
| DTC B1330 | Passenger door ajar circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and front door switch (passenger-side) |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 5V and front door switch (passenger-side) terminal G<br>• Front door switch malfunction<br>• BCM malfunction |




FRONT DOOR SWITCH WIRING HARNESS-SIDE CONNECTOR




BCM WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FRONT DOOR SWITCH (PASSENGER-SIDE) CONNECTOR**<br>• Turn the ignition switch off.<br>• Disconnect the front door switch (passenger-side) connector.<br>• Inspect the front door switch (passenger-side) connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT FRONT DOOR SWITCH (PASSENGER-SIDE) SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 5V (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible open circuit, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT FRONT DOOR LATCH AND LOCK ACTUATOR (PASSENGER-SIDE)**<br>• Inspect the front door switch (passenger-side).<br>(See 09-14-6 FRONT DOOR LATCH AND LOCK ACTUATOR INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the front door switch (passenger-side), then go to the next step.<br>(See 09-14-5 FRONT DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test.<br>(See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM.<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

**DTC B1342[BCM]**

id0902f5839600

| DTC B1342 | ECU is faulted |
|---|---|
| DETECTION CONDITION | BCM microcomputer malfunction |
| POSSIBLE CAUSE | • BCM microcomputer malfunction |

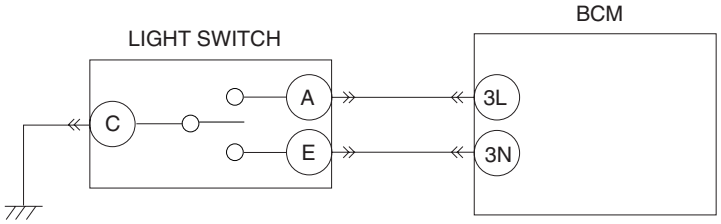
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DTC**<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Start the engine.<br>• Is the same DTC present? | Yes | Replace the BCM.<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1502[BCM]

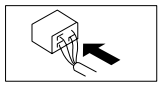
id0902f5834200

| DTC B1502 | Turn signal left circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and turn switch |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 3L and light switch terminal A<br>• Light switch malfunction<br>• BCM malfunction |



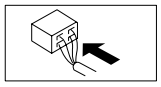

LIGHT SWITCH WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Q | O | M | K | I | E | C | A | |
| R | P | N | L | J | H | F | D | B |



BCM WIRING HARNESS-SIDE CONNECTOR

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3W | 3U | 3S | 3Q | 3O | 3M | 3K | 3I | 3G | 3E | 3C | 3A |
| 3X | 3V | 3T | 3R | 3P | 3N | 3L | 3J | 3H | 3F | 3D | 3B |



09-02F

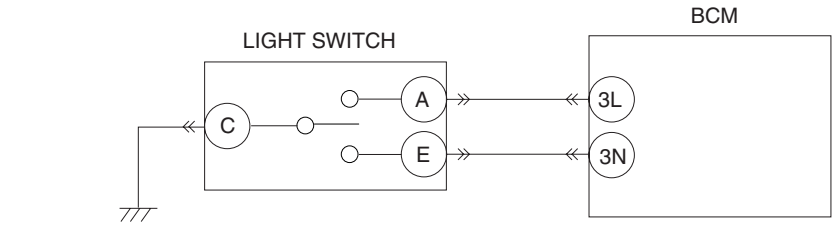
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT LIGHT SWITCH CONNECTOR**<br>• Disconnect the light switch connector.<br>• Inspect the light switch connector terminals for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT LIGHT SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between following terminals:<br>— BCM terminal 3L (wiring harness-side) — body GND<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT LIGHT SWITCH**<br>• Inspect the light switch.<br>• Is there any malfunction? | Yes | Replace the light switch, then go to the next step. (See 09-18-14 LIGHT SWITCH INSPECTION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

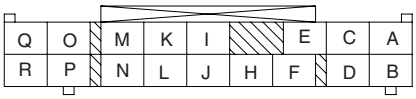
## DTC B1506[BCM]

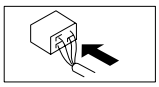
id0902f5831600

| DTC B1506 | Turn signal right circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and turn switch |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 3N and light switch terminal E<br>• Light switch malfunction<br>• BCM malfunction |

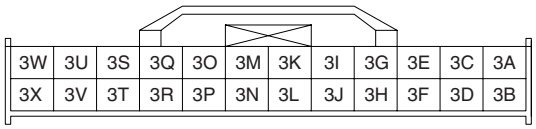


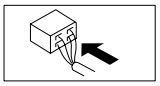

LIGHT SWITCH WIRING HARNESS-SIDE CONNECTOR



BCM WIRING HARNESS-SIDE CONNECTOR



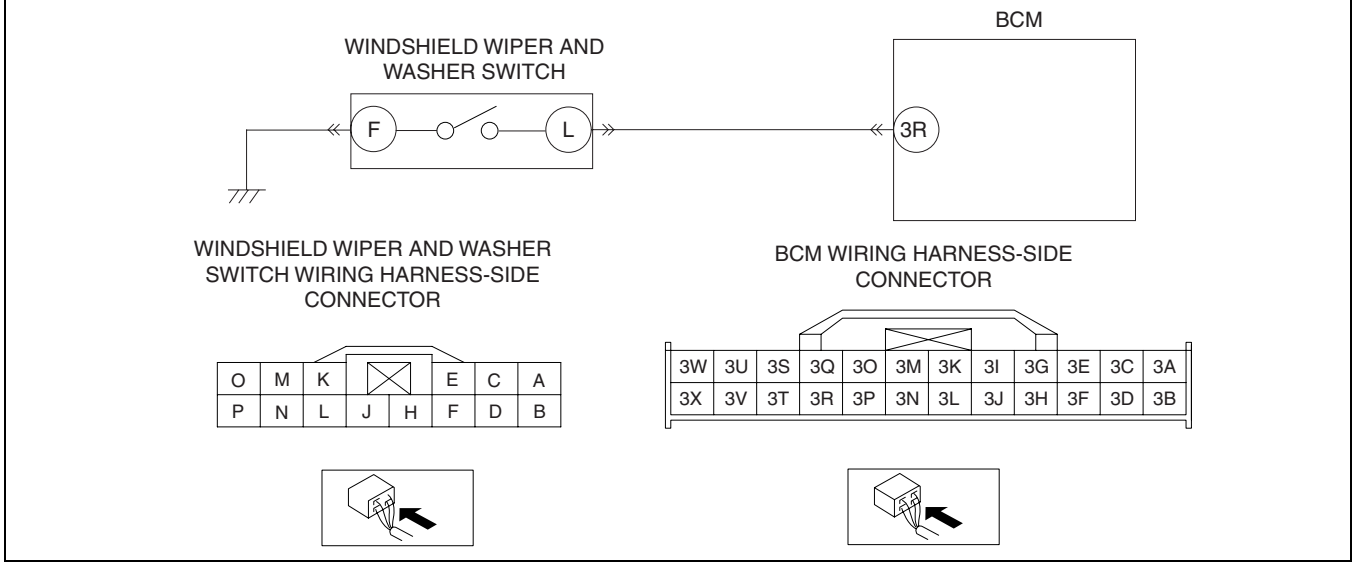
### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT LIGHT SWITCH CONNECTOR**<br>• Disconnect the light switch connector.<br>• Inspect the light switch connector terminals for poor connection (such as damaged/ pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT LIGHT SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between following terminals:<br>— BCM terminal 3N (wiring harness-side) — body GND<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT LIGHT SWITCH**<br>• Inspect the light switch.<br>• Is there any malfunction? | Yes | Replace the light switch, then go to the next step. (See 09-18-14 LIGHT SWITCH INSPECTION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1614[BCM]

id0902f5831900

| DTC B1614 | Rear wiper interval switch input circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and rear wiper and washer switch (INT) |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 3R and windshield wiper and washer switch terminal L<br>• Windshield wiper and washer switch malfunction<br>• BCM malfunction |



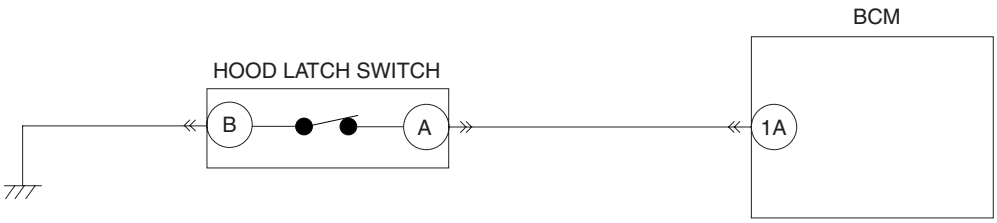

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT WINDSHIELD WIPER AND WASHER SWITCH CONNECTOR**<br>• Disconnect the windshield wiper and washer switch connector.<br>• Inspect the windshield wiper and washer switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT WINDSHIELD WIPER AND WASHER SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 3R (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT WINDSHIELD WIPER AND WASHER SWITCH**<br>• Inspect the windshield wiper and washer switch.<br>(See 09-19-8 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the windshield wiper and washer switch, then go to the next step.<br>(See 09-19-8 WIPER AND WASHER SWITCH REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test.<br>(See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM.<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

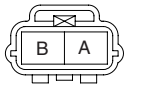
**DTC B1520[BCM]**

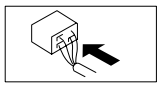
id0902f5834300

| DTC B1520 | Hood switch ajar circuit open |
|---|---|
| DETECTION CONDITION | Open circuit in wiring harness between BCM and hood latch switch |
| POSSIBLE CAUSE | • Open circuit in wiring harness between BCM terminal 1A and hood latch switch terminal A<br>• Open circuit in wiring harness between hood latch switch terminal B and body GND<br>• Hood latch switch malfunction<br>• BCM malfunction |

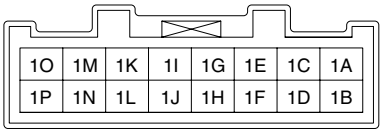


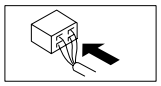

HOOD LATCH SWITCH WIRING HARNESS-SIDE CONNECTOR



BCM WIRING HARNESS-SIDE CONNECTOR



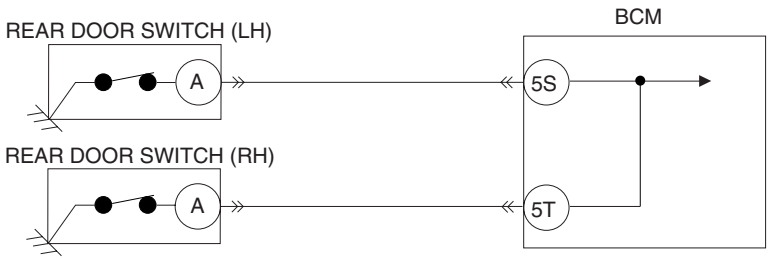
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT HOOD LATCH SWITCH CONNECTOR**<br>• Turn the ignition switch off.<br>• Disconnect the hood latch switch connector.<br>• Inspect the hood latch switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 6. |
| | | No | Go to the next step. |
| 3 | **INSPECT HOOD LATCH SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between BCM terminal 1A (wiring harness-side) and hood latch switch terminal A (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to Step 6. |
| 4 | **INSPECT HOOD LATCH SWITCH GND CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between hood latch switch terminal B (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to Step 6. |
| 5 | **INSPECT HOOD LATCH SWITCH**<br>• Inspect the hood latch switch. (See 09-14-6 FRONT DOOR LATCH AND LOCK ACTUATOR INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the hood latch switch, then go to the next step. (See 09-14-5 FRONT DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 6 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

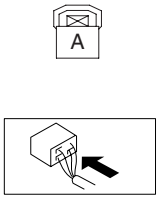
## DTC B1566[BCM]

id0902f5838200

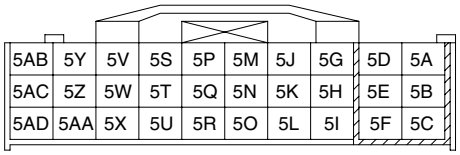
| DTC B1566 | Door ajar circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and door switches |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 5S and rear door switch (LH) terminal A<br>• Short to GND in wiring harness between BCM terminal 5T and rear door switch (RH) terminal A<br>• Rear door switch malfunction<br>• BCM malfunction |




REAR DOOR SWITCH HARNESS-SIDE CONNECTOR




BCM WIRING HARNESS-SIDE CONNECTOR



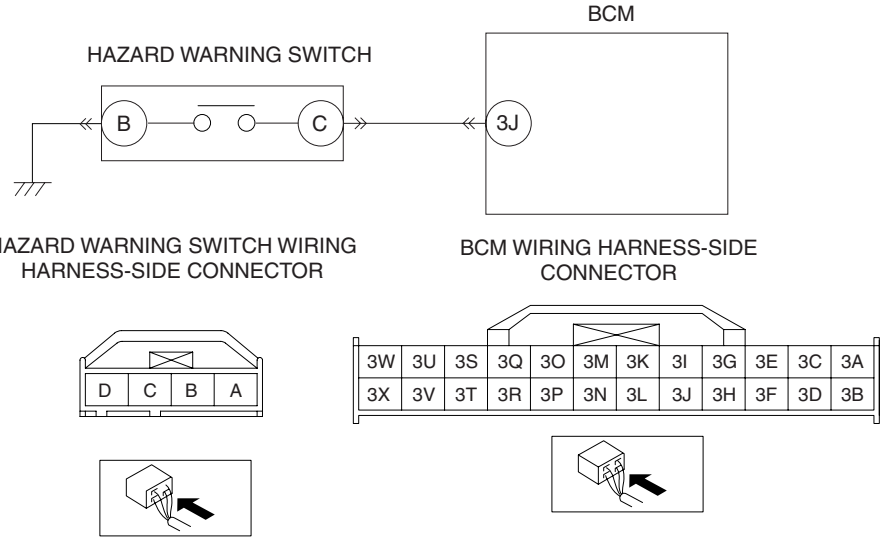

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT REAR DOOR SWITCH CONNECTOR**<br>• Turn the ignition switch off.<br>• Disconnect the rear door switch connector.<br>• Inspect the rear door switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT SLIDING DOOR SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 5S, 5T (wiring harness-side) body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible open circuit, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT REAR DOOR SWITCH**<br>• Inspect the rear door switch. (See 09-18-27 DOOR SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the rear door switch, then go to the next step. (See 09-18-26 DOOR SWITCH REMOVAL/ INSTALLATION) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B1873[BCM]

id0902f5832200

| DTC B1873 | Hazard switch input circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and hazard warning switch |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 3J and hazard warning switch terminal C<br>• Hazard warning switch malfunction<br>• BCM malfunction |



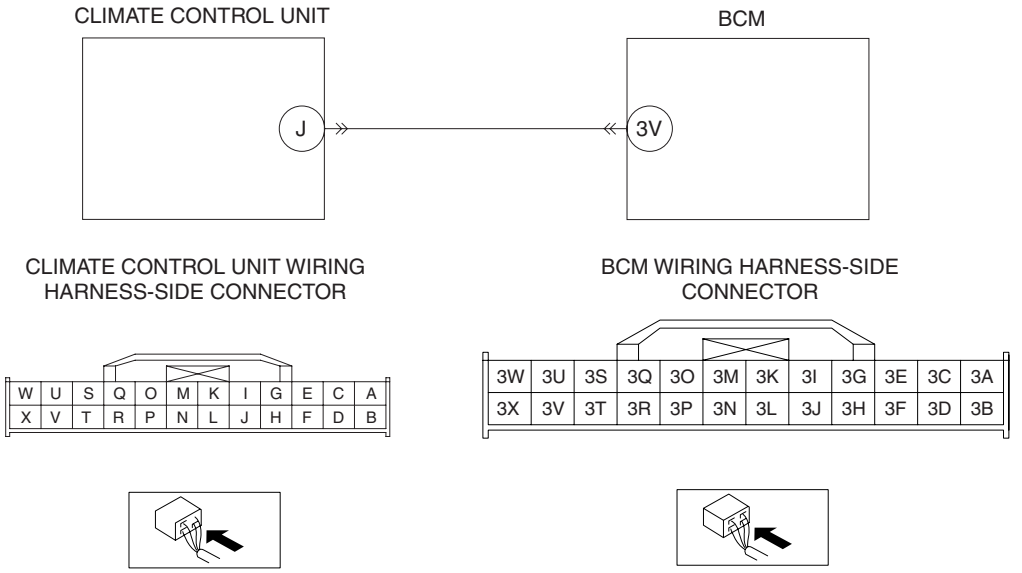

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT HAZARD WARNING SWITCH CONNECTOR**<br>• Disconnect the hazard warning switch connector.<br>• Inspect the hazard warning switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT HAZARD WARNING SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 3J (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT HAZARD WARNING SWITCH**<br>• Inspect the hazard warning switch. (See 09-18-15 HAZARD WARNING SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the hazard warning switch, then go to the next step. (See 09-18-15 HAZARD WARNING SWITCH REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2175[BCM]

id0902f5832400

| | |
|---|---|
| **DTC B2175** | **A/C request switch circuit short to ground** |
| **DETECTION CONDITION** | Short to GND in wiring harness between BCM and climate control unit (A/C ON request) |
| **POSSIBLE CAUSE** | • Short to GND in wiring harness between BCM terminal 3V and climate control unit terminal J<br>• Climate control unit malfunction<br>• BCM malfunction |



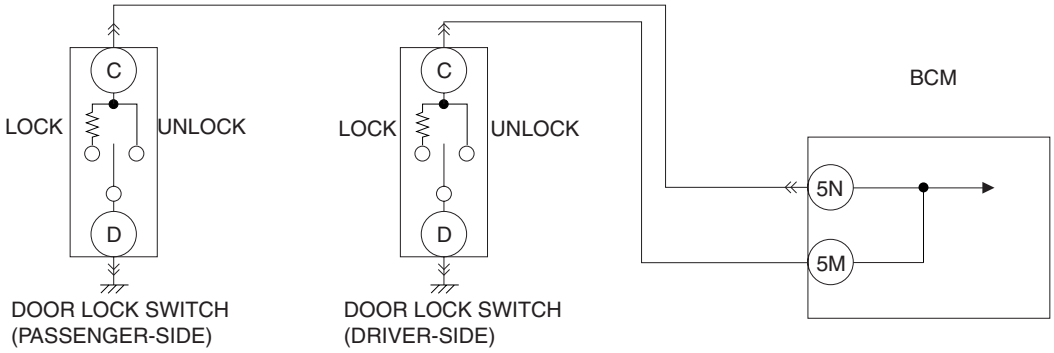

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT CLIMATE CONTROL UNIT CONNECTOR**<br>• Disconnect the climate control unit connector.<br>• Inspect the climate control unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT CLIMATE CONTROL UNIT SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 3V (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT CLIMATE CONTROL UNIT**<br>• Inspect the climate control unit. (See 07-40-16 CLIMATE CONTROL UNIT INSPECTION [MANUAL AIR CONDITIONER].)<br>• Is there any malfunction? | Yes | Replace the climate control unit, then go to the next step. (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER], 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

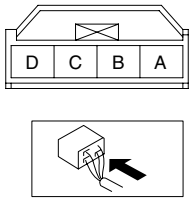
## DTC B2218[BCM]

id0902f5839700

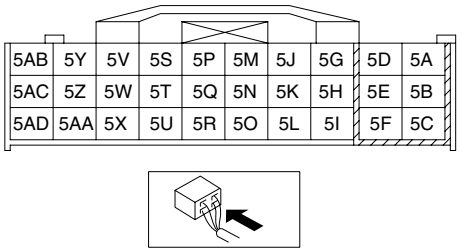
| DTC B2218 | Door lock switch circuit short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and door lock switches |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 5M and door lock switch (driver-side) terminal C<br>• Short to GND in wiring harness between BCM terminal 5N and door lock switch (passenger-side) terminal C<br>• Door lock switches malfunction<br>• BCM malfunction |




DOOR LOCK SWITCH WIRING HARNESS-SIDE CONNECTOR




BCM WIRING HARNESS-SIDE CONNECTOR




09-02F

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT DOOR LOCK SWITCH CONNECTOR**<br>• Disconnect the door lock switch connector.<br>• Inspect the door lock switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT DOOR LOCK SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 5M, 5N (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT DOOR LOCK SWITCH**<br>• Inspect the door lock switch. (See 09-14-8 DOOR LOCK SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the door lock switch, then go to the next step. (See 09-14-8 DOOR LOCK SWITCH REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

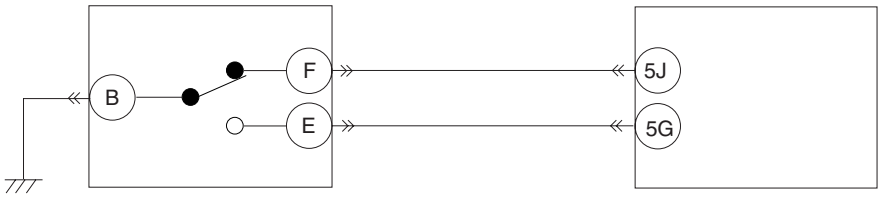
**DTC B2574[BCM]**

id0902f5833100

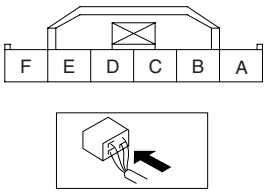
| DTC B2574 | Driver door lock switch short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and driver-side door lock-link switch |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 5G and front door latch and lock actuator (driver-side) terminal E<br>• Front door latch and lock actuator (driver-side) malfunction<br>• BCM malfunction |

FRONT DOOR LATCH AND LOCK ACTUATOR (DRIVER-SIDE)

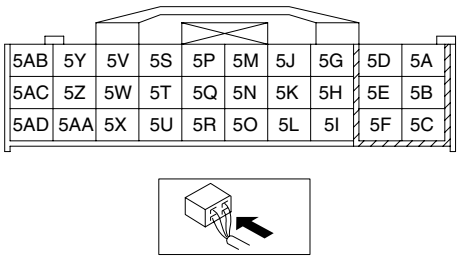
BCM




FRONT DOOR LATCH AND LOCK ACTUATOR (DRIVER-SIDE) WIRING HARNESS-SIDE CONNECTOR




BCM WIRING HARNESS-SIDE CONNECTOR



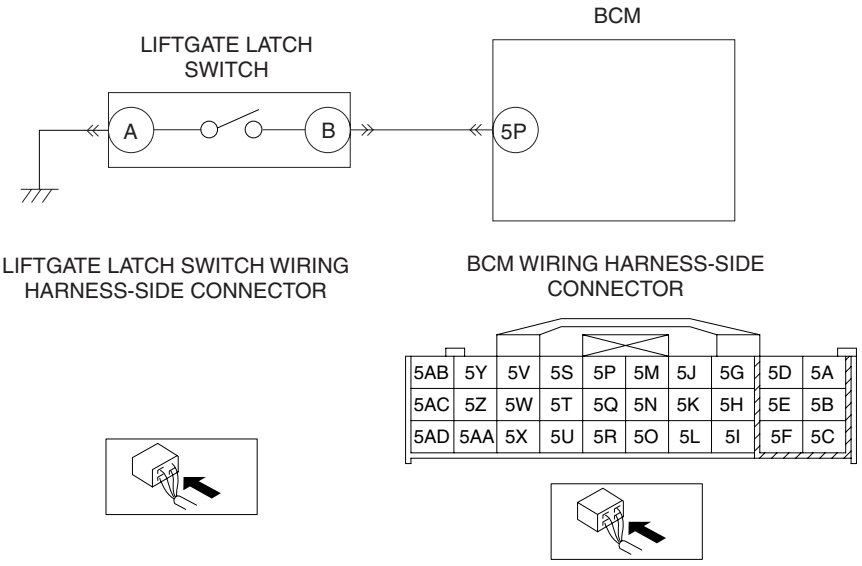
**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT FRONT DOOR LATCH AND LOCK ACTUATOR (DRIVER-SIDE) CONNECTOR**<br>• Disconnect the front door latch and lock actuator (driver-side) connector.<br>• Inspect the front door latch and lock actuator (driver-side) connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT FRONT DOOR LATCH AND LOCK ACTUATOR (DRIVER-SIDE) SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 5G (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT FRONT DOOR LATCH AND LOCK ACTUATOR (DRIVER-SIDE)**<br>• Inspect the front door latch and lock actuator (driver-side). (See 09-14-6 FRONT DOOR LATCH AND LOCK ACTUATOR INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the front door latch and lock actuator (driver-side), then go to the next step. (See 09-14-5 FRONT DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2721[BCM]

id0902f5833300

| DTC B2721 | Liftgate ajar output short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and liftgate latch switch |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 5P and liftgate latch switch terminal B<br>• Liftgate latch switch malfunction<br>• BCM malfunction |



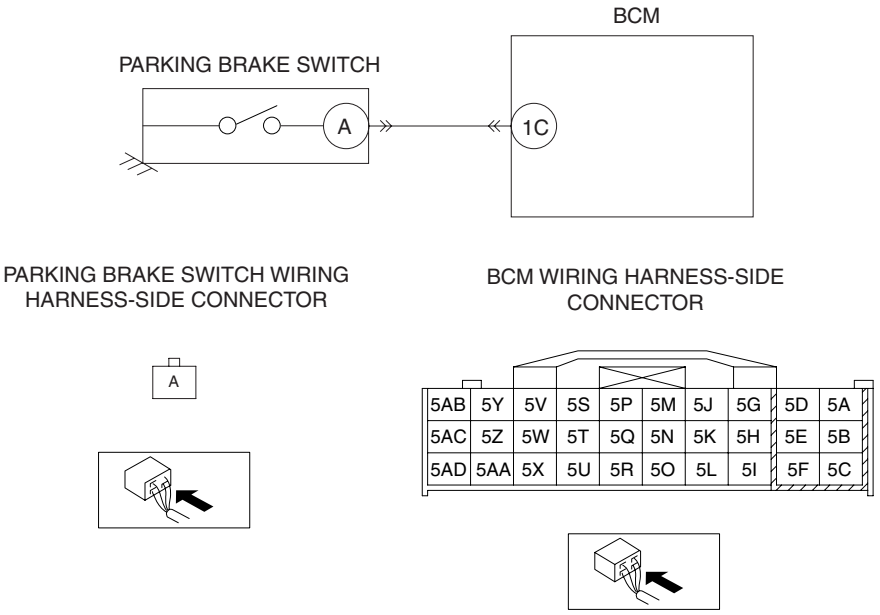

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT LIFTGATE LATCH SWITCH CONNECTOR**<br>• Disconnect the liftgate latch switch connector.<br>• Inspect the liftgate latch switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT LIFTGATE LATCH SWITCH SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 5P (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT LIFTGATE LATCH SWITCH**<br>• Inspect the liftgate latch switch. (See 09-14-10 LIFTGATE LATCH SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the liftgate latch switch, then go to the next step. (See 09-14-10 LIFTGATE LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC B2982[BCM]

id0902f5838300

| | |
|---|---|
| **DTC B2982** | **Park brake switch circuit open** |
| **DETECTION CONDITION** | Open circuit in wiring harness between BCM and parking brake switch |
| **POSSIBLE CAUSE** | • Open circuit in wiring harness between BCM terminal 1C and parking brake switch terminal A<br>• Parking brake switch malfunction<br>• BCM malfunction |



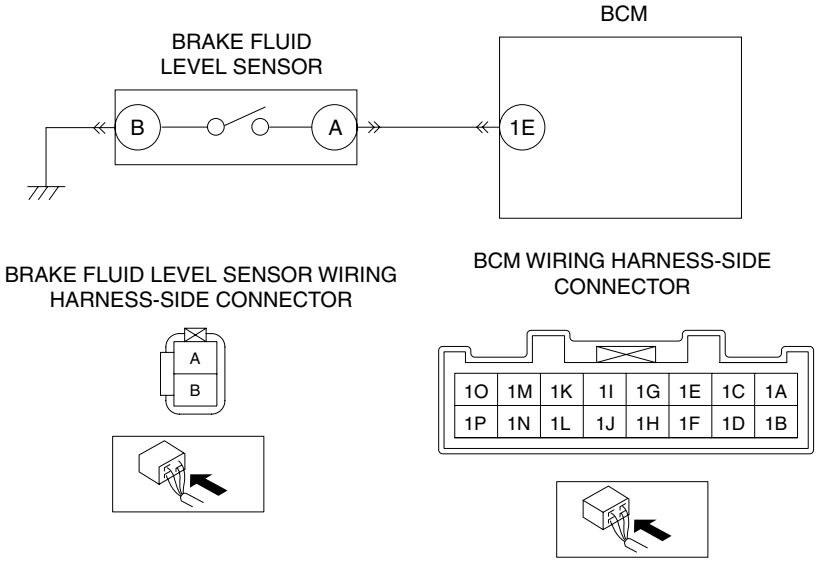

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT PARKING BRAKE SWITCH CONNECTOR**<br>• Turn the ignition switch off.<br>• Disconnect the parking brake switch connector.<br>• Inspect the parking brake switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT PARKING BRAKE SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between BCM terminal 1C (wiring harness-side) and parking brake switch terminal A (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to Step 5. |
| 4 | **INSPECT PARKING BRAKE SWITCH**<br>• Inspect the parking brake switch. (See 04-12-13 PARKING BRAKE SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the parking brake switch, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC C1189[BCM]

id0902f5836600

| DTC C1189 | Brake fluid level sensor input short to ground |
|---|---|
| DETECTION CONDITION | Short to GND in wiring harness between BCM and brake fluid level sensor |
| POSSIBLE CAUSE | • Short to GND in wiring harness between BCM terminal 1E and brake fluid level sensor terminal A<br>• Brake fluid level sensor input malfunction<br>• BCM malfunction |



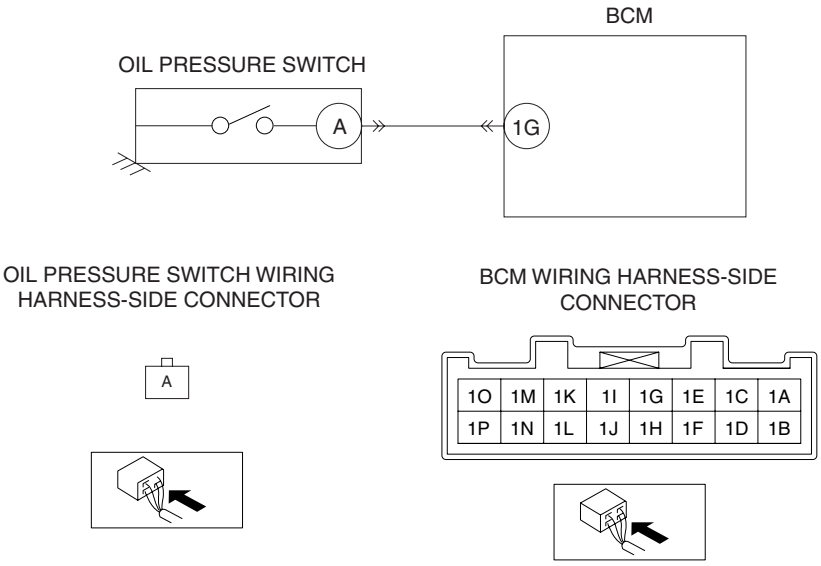

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT BRAKE FLUID LEVEL SENSOR CONNECTOR**<br>• Disconnect the brake fluid level sensor connector.<br>• Inspect the brake fluid level sensor connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT BRAKE FLUID LEVEL SENSOR SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between BCM terminal 1E (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Repair or replace the wiring harness for a possible short to GND, then go to Step 5. |
| | | No | Go to the next step. |
| 4 | **INSPECT BRAKE FLUID LEVEL SENSOR**<br>• Inspect the brake fluid level sensor. (See 04-11-11 BRAKE FLUID LEVEL SENSOR INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the brake fluid level sensor, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

## DTC C1284[BCM]

id0902f5838400

| DTC C1284 | Oil pressure switch circuit failure |
|---|---|
| DETECTION CONDITION | Open circuit in wiring harness between BCM and oil pressure switch |
| POSSIBLE CAUSE | • Open circuit in wiring harness between BCM terminal 1G and oil pressure switch terminal A<br>• Oil pressure switch malfunction<br>• BCM malfunction |



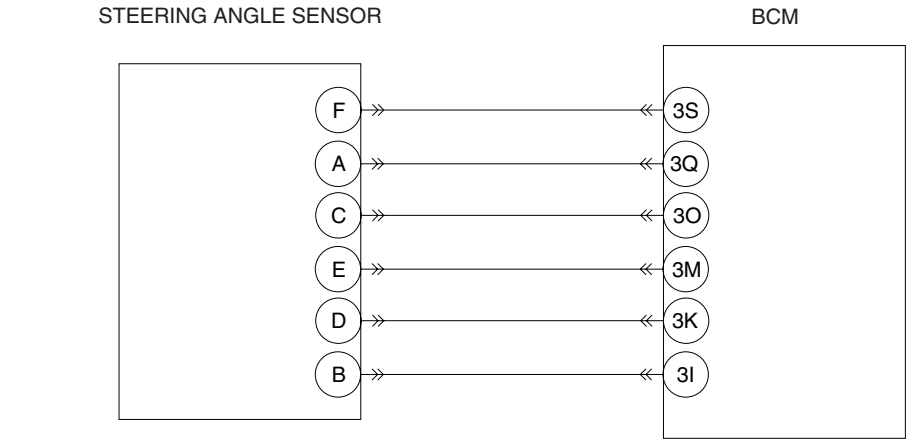

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT OIL PRESSURE SWITCH CONNECTOR**<br>• Turn the ignition switch off.<br>• Disconnect the oil pressure switch connector.<br>• Inspect the oil pressure switch connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 2 | **INSPECT BCM CONNECTOR**<br>• Disconnect the BCM connector.<br>• Inspect the BCM connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Is there any malfunction? | Yes | Repair or replace the terminal, then go to Step 5. |
| | | No | Go to the next step. |
| 3 | **INSPECT OIL PRESSURE SWITCH SIGNAL CIRCUIT FOR OPEN CIRCUIT**<br>• Inspect for continuity between BCM terminal 1G (wiring harness-side) and oil pressure switch terminal A (wiring harness-side).<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness for a possible open circuit, then go to Step 5. |
| 4 | **INSPECT OIL PRESSURE SWITCH**<br>• Inspect the oil pressure switch. (See 09-22-14 OIL PRESSURE SWITCH INSPECTION.)<br>• Is there any malfunction? | Yes | Replace the oil pressure switch, then go to the next step. |
| | | No | Go to the next step. |
| 5 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Perform the self-test. (See 09-02F-26 BCM SELF-TEST[BCM].)<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

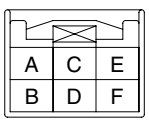
## DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C[BCM]

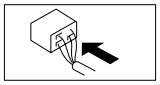
id0902f5839800

| DTC C1295, C1307, C1441, C1442, C1443, C1444, C144A, C144C | Steering angle sensor system |
|---|---|
| **DETECTION CONDITION** | **C1295**<br>• BCM detects steering angle sensor internal abnormality (signal overflow)<br>**C1307**<br>• BCM detects steering angle sensor internal abnormality (signal jump)<br>**C1441, C1442, C144C**<br>• Open circuit in wiring harness between BCM and steering angle sensor<br>**C1443, C1444, C144A**<br>• Short to GND in wiring harness between BCM and steering angle sensor |
| **POSSIBLE CAUSE** | • Improper installation or positioning of the steering angle sensor<br>• Steering wheel is off-center<br>• Open circuit in wiring harness between BCM terminal 3S and steering angle sensor terminal F<br>• Open circuit or short to power supply in wiring harness between BCM terminal 3Q and steering angle sensor terminal A<br>• Open circuit or short to power supply in wiring harness between BCM terminal 3O and steering angle sensor terminal C<br>• Open circuit or short to power supply in wiring harness between BCM terminal 3M and steering angle sensor terminal E<br>• Open circuit or short to power supply in wiring harness between BCM terminal 3K and steering angle sensor terminal D<br>• Open circuit in wiring harness between BCM terminal 3I and steering angle sensor terminal B<br>• Short to GND in wiring harness between BCM terminal 3S and steering angle sensor terminal F<br>• Short to GND in wiring harness between BCM terminal 3Q and steering angle sensor terminal A<br>• Short to GND in wiring harness between BCM terminal 3O and steering angle sensor terminal C<br>• Short to GND in wiring harness between BCM terminal 3M and steering angle sensor terminal E<br>• Short to GND in wiring harness between BCM terminal 3K and steering angle sensor terminal D<br>• Steering angle sensor signal circuit short each other<br>• Steering angle sensor malfunction<br>• BCM malfunction |

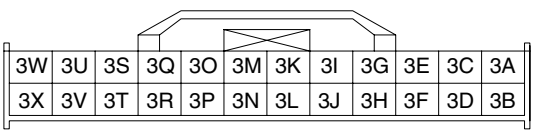


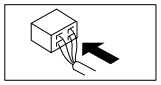

STEERING ANGLE SENSOR WIRING HARNESS-SIDE CONNECTOR



BCM WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT STEERING WHEEL FOR OFF-CENTER**<br>• Drive the vehicle and inspect the steering wheel position while driving in a straight line.<br>• Is the steering wheel off-center? | Yes | Inspect and adjust the front wheel alignment to correct the steering wheel alignment, then go to Step 9.<br>(See 02-11-2 FRONT WHEEL ALIGNMENT.) |
| | | No | Go to the next step. |
| 2 | **INSPECT STEERING ANGLE SENSOR POWER SUPPLY CIRCUIT FOR OPEN**<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage between the steering angle sensor terminal F and body GND.<br>• Is the voltage **5 V**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness, then go to Step 9. |
| 3 | **INSPECT STEERING ANGLE SENSOR GND CIRCUIT FOR OPEN**<br>• Turn the ignition switch off.<br>• Disconnect the steering angle sensor connector.<br>• Inspect for continuity between the steering angle sensor terminal B (wiring harness-side) and body GND.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness, then go to Step 9. |
| 4 | **INSPECT STEERING ANGLE SENSOR SIGNAL CIRCUIT FOR OPEN**<br>• Disconnect the BCM connector.<br>• Inspect for continuity between the following terminals:<br>— BCM terminal 3Q— steering angle sensor terminal A (wiring harness-side)<br>— BCM terminal 3O— steering angle sensor terminal C (wiring harness-side)<br>— BCM terminal 3M— steering angle sensor terminal E (wiring harness-side)<br>— BCM terminal 3K— steering angle sensor terminal D (wiring harness-side)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness, then go to Step 9. |
| 5 | **INSPECT STEERING ANGLE SENSOR SIGNAL CIRCUIT FOR SHORT TO GND**<br>• Inspect for continuity between the following terminals and body GND:<br>— Steering angle sensor terminal A (wiring harness-side)<br>— Steering angle sensor terminal C (wiring harness-side)<br>— Steering angle sensor terminal E (wiring harness-side)<br>— Steering angle sensor terminal D (wiring harness-side)<br>• Is there continuity? | Yes | Repair or replace the wiring harness, then go to Step 9. |
| | | No | Go to the next step. |
| 6 | **INSPECT STEERING ANGLE SENSOR SIGNAL CIRCUIT FOR SHORT TO POWER SUPPLY**<br>• Measure voltage between the following and body GND:<br>— Steering angle sensor terminal A (wiring harness-side)<br>— Steering angle sensor terminal C (wiring harness-side)<br>— Steering angle sensor terminal E (wiring harness-side)<br>— Steering angle sensor terminal D (wiring harness-side)<br>• Is the voltage **1 V or less**? | Yes | Go to the next step. |
| | | No | Repair or replace the wiring harness, then go to Step 9. |
| 7 | **INSPECT FOR IMPROPER INSTALLATION OF STEERING ANGLE SENSOR**<br>• Is the installation normal? | Yes | Go to the next step. |
| | | No | Repair installation or replace the steering angle sensor, then go to Step 9. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | **INSPECT STEERING ANGLE SENSOR**<br>• Inspect the steering angle sensor. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)<br>• Is the steering angle sensor normal? | Yes | Go to the next step. |
| | | No | Replace the steering angle sensor, then go to Step 9. |
| 9 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Start the engine and drive the vehicle at **10 km/h {6.2 mph} or more**.<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

### DTC C1937[BCM]

id0902f5839300

| DTC C1937 | Steering wheel angle sensor offset failure |
|---|---|
| DETECTION CONDITION | BCM lost steering angle initialization position |
| POSSIBLE CAUSE | • Steering wheel is operated suddenly during sleep control<br>• Steering angle sensor malfunction<br>• BCM malfunction |

**Diagnostic procedure**

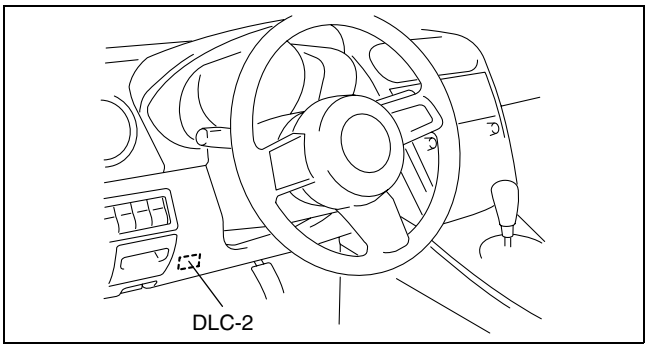
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **PERFORM STEERING ANGLE SENSOR INITIALIZATION**<br>• Perform steering angle sensor initialization. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)<br>• TCS OFF light and DSC/TCS indicator light go out? | Yes | Inspect the steering angle sensor and related wiring harness.<br>• Repair ore replace if necessary.<br>Go to the next step. |
| | | No | Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING COMPLETED**<br>• Make sure to reconnect all disconnected connectors.<br>• Clear the DTC from the BCM memory using the M-MDS.<br>• Turn the ignition switch to LOCK position then ON position.<br>• Is the same DTC present? | Yes | Replace the BCM. (See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |
| | | No | DTC troubleshooting completed. |

### BCM SELF-TEST[BCM]

id0902f5830600

1. Connect the M-MDS to the DLC-2.
2. Set up the M-MDS (including the vehicle recognition).
3. Verify the following vehicle conditions:
   - All the switches are turned off (except the ignition switch).
   - All the doors, hood, and liftgate are closed.
   - All the doors, and liftgate are unlocked.
   - Parking brake lever is pulled.
4. Start the engine.

   **Note**
   - If the engine is not running, the BCM determines that the oil pressure switch malfunction.

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5. Perform procedures according to directions on the M-MDS screen.
6. Verify if any DTCs are displayed.
   - If any DTCs are displayed, perform the troubleshooting according to the corresponding DTC inspection.
7. Disconnect the M-MDS.

# 09-02G ON-BOARD DIAGNOSTIC [AUDIO]

**STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE[AUDIO] . . . . . 09-02G–1**
**SUPPLIER IDENTIFICATION PROCEDURE[AUDIO] . . . . . 09-02G–2**
Identification Using the Label or Inscribed Lettering . . . . . **09-02G–2**
Identification Using the On-board Diagnostic Test Mode. . . . . **09-02G–2**
**MEMORY CLEARING PROCEDURE [AUDIO] . . . . . 09-02G–2**
**DTC TABLE[AUDIO] . . . . . 09-02G–3**
**DTC 16:ER12[AUDIO] . . . . . 09-02G–4**
**DTC 17:ER11[AUDIO] . . . . . 09-02G–4**
**DIAGNOSTIC ASSIST FUNCTION [AUDIO] . . . . . 09-02G–5**
Structural View . . . . . **09-02G–5**
Button Inspection . . . . . **09-02G–5**
Speaker Inspection . . . . . **09-02G–5**
Radio Reception Condition Inspection. . . . . **09-02G–6**
Antenna control condition inspection. . . . . **09-02G–6**

## STARTING PROCEDURE FOR ON-BOARD DIAGNOSTIC TEST MODE[AUDIO]

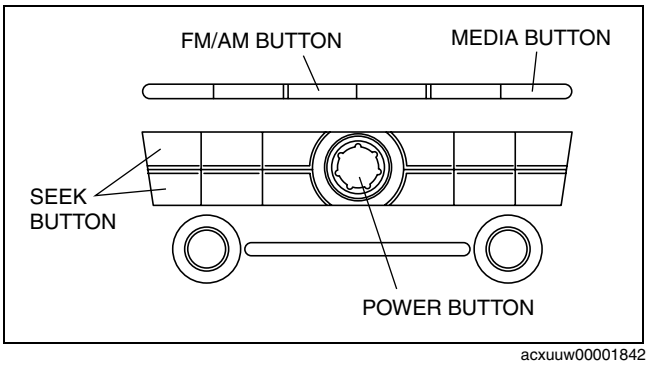
id0902f6803700

**Note**
- All DTCs displayed in the on-board diagnostic test mode should be entered in the Audio Repair Order Form.

1. Turn the ignition switch to the ACC or ON position.
2. Turn the POWER switch off.
3. While pressing the POWER button, simultaneously press the FM/AM button and the MEDIA button for **2 s or more.**

**Note**
- If several DTCs are in the memory, they can be displayed using the SEEK button (up or down).

4. To stop the on-board diagnostic test mode, turn the ignition switch off.

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## SUPPLIER IDENTIFICATION PROCEDURE[AUDIO]

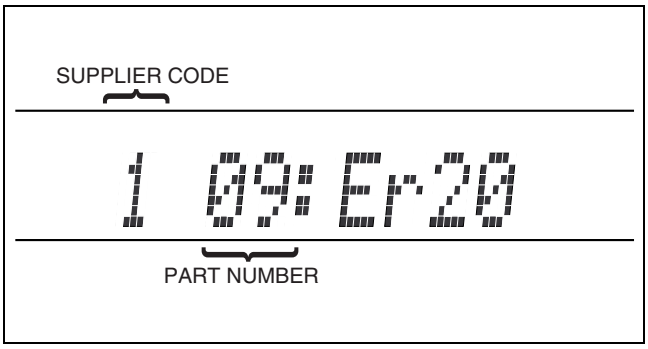
id0902f6803800

**Note**
- The supplier can vary with the module. When asking the supplier (service center) for repair or replacement, identify the supplier and fill in the Audio Repair Order Form with the following procedures.

**Identification Using the Label or Inscribed Lettering**
1. Remove the audio unit.
2. Verify the supplier by referring to the label attached to each unit.

**Identification Using the On-board Diagnostic Test Mode.**
1. Start the on-board diagnostic test mode.
2. Identify the device and supplier codes by referring to the information display.

**Note**
- If no DTC is stored, no codes will be displayed.

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| Supplier code | Supplier name |
|---|---|
| 1 | SANYO Automedia |
| 2 | Panasonic |
| 3 | Clarion |
| 4 | Pioneer |

| Part number | Part name |
|---|---|
| 00 | Cassette deck |
| 03 | CD player |
| 05 | CD changer (external) |
| 06 | CD changer |
| 09 | Base unit |
| 10 | MP3 applicable CD player system |
| 16 | CAN system |
| 17 | CAN system |
| 21 | Audio cover |
| 22 | MP3 applicable CD changer |

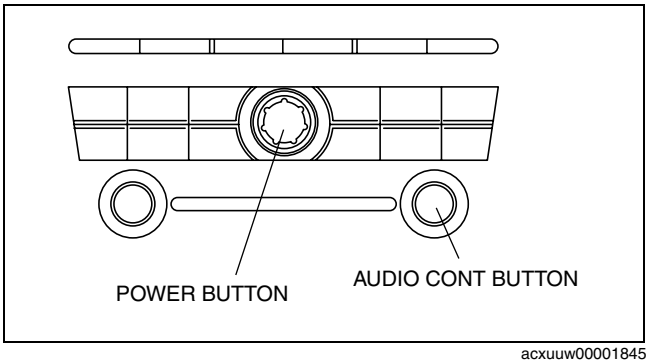
## MEMORY CLEARING PROCEDURE[AUDIO]

id0902f6803900

1. Start the on-board diagnostic test mode.
2. While pressing the POWER button, simultaneously press the AUDIO CONT button for **2 s or more.**

**Caution**
- **Before clearing the memory, be sure to enter all of the DTCs displayed in the on-board diagnostic test mode in the Audio Repair Order Form.**

3. To stop the on-board diagnostic test mode, turn the ignition switch off.

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## DTC TABLE[AUDIO]

id0902f6804000

| Screen display<br>DTC<br>(When starting on-board diagnostic test function) | Detection condition | Possible cause/inspection |
|---|---|---|
| 00: Er01 | Cassette deck cannot implement insert and eject commands. | Cassette deck malfunction |
| 00: Er03 | Reel built into cassette deck does not operate. | Verify condition of the cassette deck. |
| 00: Er04 | Cassette tape is worn out. | • Tape wear<br>• Verify condition of the cassette deck. |
| 00: Er10 | Cassette deck does not operate. | • Malfunction of connectors between base unit and cassette deck<br>• Cassette deck malfunction |
| 03: Er01 | CD player cannot implement insert and eject commands. | CD player malfunction |
| 03: Er02 | Cannot change tracks. | CD player malfunction |
| 03: Er07 | CD reading error. | • Defective CD (scratches or dirt)<br>• CD player malfunction |
| 03: Er10 | CD player does not operate. | • Malfunction of connectors between base unit and CD player<br>• CD player malfunction |
| 05: Er01 | CD changer (external) cannot implement insert, eject, and disc change commands. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• CD changer (external) malfunction |
| 05: Er07 | CD reading error. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• CD changer (external) malfunction |
| 05: Er10 | CD changer (external) does not operate. | • Malfunction of connectors between base unit and CD changer (external)<br>• CD changer (external) malfunction |
| 06: Er01 | CD changer cannot implement insert, eject, and disc change commands. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• CD changer malfunction |
| 06: Er02 | Cannot change tracks. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• CD changer malfunction |
| 06: Er07 | CD reading error. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• CD changer malfunction |
| 06: Er10 | CD changer does not operate. | • Malfunction of connectors between base unit and CD changer<br>• CD changer malfunction |
| 09: Er20 | Audio system does not operate. | Voltage at base unit is low. |
| 09: Er21 | Broken sound/No sound | Inspect the audio system operation according to vehicle condition. |
| 09: Er22 | No radio reception | Inspect the radio operation according to vehicle condition. |
| 10: Er01 | MP3 applicable CD player cannot implement insert and eject commands. | MP3 applicable CD player malfunction |
| 10: Er02 | Cannot change tracks. | MP3 applicable CD player malfunction |
| 10: Er07 | MP3 CD reading error. | Incorrect format CD |
| 10: Er10 | MP3 applicable CD player does not operate. | • Malfunction of connectors between base unit and MP3 applicable CD player<br>• MP3 applicable CD player malfunction |
| 16: Er12 | — | CAN system |
| 17: Er11 | — | CAN system |
| 21: Er17 | Incorrect combination (base unit and audio cover) | Install the correct base unit or the audio cover. |
| 21: Er18 | | |
| 21: Er19 | Communication error between base unit and audio cover | Malfunction of connectors between base unit and audio cover |

| Screen display<br>DTC<br>(When starting on-board diagnostic test function) | Detection condition | Possible cause/inspection |
|---|---|---|
| 22: Er01 | MP3 applicable CD changer cannot implement insert, eject, and disc change commands. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• MP3 applicable CD changer malfunction |
| 22: Er02 | Cannot change tracks. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• MP3 applicable CD changer malfunction |
| 22: Er07 | CD reading error. | • Defective CD (curved, broken or foreign material stuck/attached, etc.)<br>• MP3 applicable CD changer malfunction |
| 22: Er10 | MP3 applicable CD changer does not operate. | • Malfunction of connectors between base unit and MP3 applicable CD changer<br>• MP3 applicable CD changer malfunction |
| no Err | No DTCs stored | No DTCs stored |

### DTC 16:ER12[AUDIO]

id0902f6804100

| DTC 16:Er12 | CAN system communication error |
|---|---|
| DETECTION CONDITION | • CAN system communication error |
| POSSIBLE CAUSE | • Malfunction of wiring harness between base unit and other CAN system related module<br>• Audio unit malfunction |

**Diagnostic procedure**

| ACTION |
|---|
| (See09-02D-2 MULTIPLEX COMMUNICATION SYSTEM[MULTIPLEX COMMUNICATION SYSTEM].) |

### DTC 17:ER11[AUDIO]

id0902f6804200

| DTC 17:Er11 | CAN system communication error |
|---|---|
| DETECTION CONDITION | • ALC function does not operate. |
| POSSIBLE CAUSE | • Malfunction of wiring harness between base unit and other CAN system related module<br>• CAN system related module malfunction |

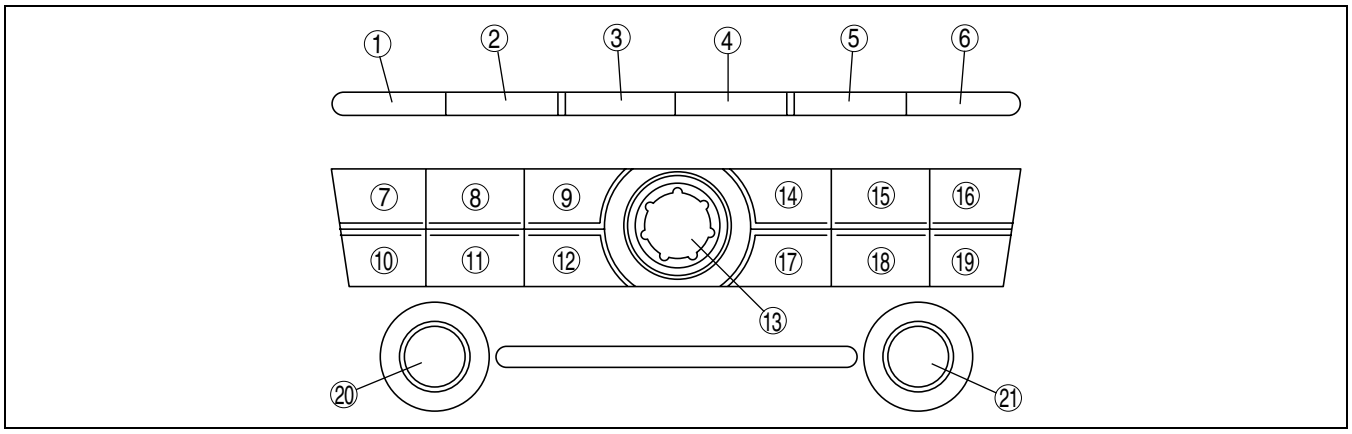
**Diagnostic procedure**

| ACTION |
|---|
| (See09-02D-2 MULTIPLEX COMMUNICATION SYSTEM[MULTIPLEX COMMUNICATION SYSTEM].) |

## DIAGNOSTIC ASSIST FUNCTION[AUDIO]

id0902f6804500

### Structural View
### Buttons

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| | |
|---|---|
| 1 | CLOCK button |
| 2 | SET /button |
| 3 | FM/AM button |
| 4 | SAT button |
| 5 | CD button |
| 6 | MEDIA button |
| 7 | TRACK/SEEK/APC button (up) |
| 8 | SCAN button |
| 9 | RPT button |
| 10 | TRACK/SEEK/APC button (down) |
| 11 | PROG button |

| | |
|---|---|
| 12 | RDM button |
| 13 | POWER/VOLUME button |
| 14 | Preset button “1” |
| 15 | Preset button “2” |
| 16 | Preset button “3” |
| 17 | Preset button “4” |
| 18 | Preset button “5” |
| 19 | Preset button “6” |
| 20 | TUNE/AUTO-M button |
| 21 | AUDIO CONT button |

09-02G

### Button Inspection

1. With the audio power on, press the POWER button and simultaneously press the MEDIA button for **approx. 1 s.**
2. Inspect according to the following table:

| INSPECTION | DISPLAY | ACTION | |
|---|---|---|---|
| • Start the button inspection mode.<br>• Press all buttons. | — | The buzzer sounds. | The button is normal. |
| | | The buzzer does not sound. | Replace the base unit. |

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

### Speaker Inspection

1. With the audio power on, press the POWER button and simultaneously press the AUTO-M button for **approx. 1 s.**
2. Inspect according to the following table:

| INSPECTION | DISPLAY | ACTION | |
|---|---|---|---|
| • Start the speaker inspection mode.<br>**With Bose**<br>• Do all the speakers output sound?<br>**Without Bose**<br>• Does each speaker output sound in the following order?<br>1. Front door speaker (LH)<br>2. Front door speaker (RH)<br>3. Rear door speaker (RH)<br>4. Rear door speaker (LH) | — | Yes | Speakers, and wiring harness between the base unit and speakers are normal. |
| | | No | • Inspect the following parts.<br>— Malfunctioning speaker<br>— Wiring harness between base unit and malfunctioning speaker |

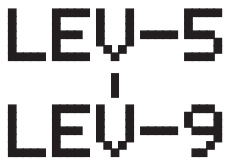
3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

**Radio Reception Condition Inspection**

1. With the audio power on, press the POWER button and simultaneously press the PRESET 2 button for **approx. 1 s.**
2. Inspect according to the following table:

**Caution**

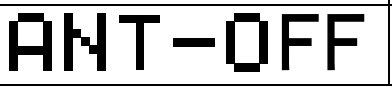
- **Even if the system is normal, radio reception may be difficult depending on where the system is inspected (indoors/outdoors, or conditions at the location). Before inspecting the system, verify that radio reception is adequate.**
- **When inspecting, select a frequency band (radio station) with the best reception.**

| INSPECTION | DISPLAY | ACTION |
|---|---|---|
| Start the radio reception condition inspection mode. | NORMAL CONDITION<br>  | Antenna, antenna feeder and base unit are normal. |
| | | Change the frequency (radio station) and inspect again. |
| | MALFUNCTION PRESENT<br> | Inspect the antenna and antenna feeder.<br>• If either the antenna or the antenna feeder is not normal, replace the malfunctioning part.<br>• If the antenna and antenna feeder are normal, replace the base unit. |

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

**Antenna control condition inspection**

1. With the audio power on and at radio mode, press the POWER button and simultaneously press the AM button for **approx. 1 s**.
2. Inspect the antenna control conditon according to the following table:

| INSPECTION | DISPLAY | ACTION | |
|---|---|---|---|
| Start antenna control condition inspection mode. | | Sound quality is good. | System is okay. |
| | | Sound quality is poor. | Inspect following parts.<br>• Center roof antenna<br>• Antenna feeder |
| |  | Replace base unit. | |

3. Turn the audio off or the ignition switch to the LOCK position to stop the diagnostic assist function.

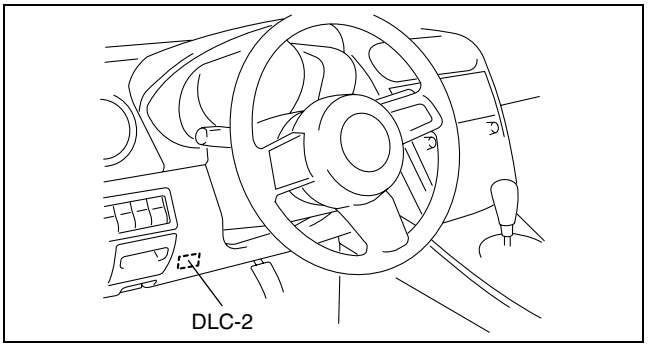
# 09-02H ON-BOARD DIAGNOSTIC [AUDIO AMPLIFIER]

**DTC INSPECTION [AUDIO AMPLIFIER]. . . . . 09-02H–1**
**DTC TABLE[AUDIO AMPLIFIER] . . . . . 09-02H–1**
**DTC B2477[AUDIO AMPLIFIER]. . . . . 09-02H–1**

## DTC INSPECTION[AUDIO AMPLIFIER]

id0902f8800200

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     — Select the “Toolbox” tab.
     — Select “Self Test”.
     — Select “Module”.
     — Select “AM”.
   - When using the PDS (pocket PC)
     — Select “Module Tests”.
     — Select “AM”.
     — Select “Self Test”.
3. Verify the DTC according to the directions on the screen.
   - If any DTCs are displayed, perform troubleshooting according to the corresponding DTC inspection.
4. After completion of repairs, clear all DTCs stored in the Audio amplifier.




acxuuw00002075

## DTC TABLE[AUDIO AMPLIFIER]

id0902f8847300

| DTC | Malfunction location | Freeze frame data | Page |
|---|---|---|---|
| B2477 | Configuration error | — | (See 09-02H-1 DTC B2477[AUDIO AMPLIFIER].) |

09-02H

## DTC B2477[AUDIO AMPLIFIER]

id0902f8847400

| | |
|---|---|
| **DTC B2477** | • **Configuration error** |
| **DETECTION CONDITION** | • Audio amplifier configuration has not been performed correctly. |
| **POSSIBLE CAUSE** | • Audio amplifier configuration error<br>• Malfunction in the audio amplifier internal circuit |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **PERFORM AUDIO AMPLIFIER CONFIGURATION**<br>• Perform audio amplifier configuration.<br>• Is B2477 displayed? | Yes | Replace the audio amplifier. |
| | | No | Go to the next step. |
| 2 | **VERIFY TROUBLESHOOTING OF DTC B2477 COMPLETED**<br>• Clear the DTC from the memory.<br>• Is B2477 displayed? | Yes | Go to the applicable DTC inspection. |
| | | No | DTC troubleshooting completed. |

# 09-03A SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

**FOREWORD[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–1**
**SYMPTOM TROUBLESHOOTING CHART[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . 09-03A–1**
**POWER WINDOW SYSTEM WIRING DIAGRAM[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–2**
Power Window Main Switch . . . . . **09-03A–2**
Power Window Subswitch (Passenger'side) . . . . . **09-03A–3**
**INTERMITTENT CONCERN TROUBLESHOOTING[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–3**
Vibration Method . . . . . **09-03A–3**
Connector Terminal Check Method . . . **09-03A–4**
**BASIC POWER WINDOW SYSTEM INSPECTION[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–4**
Manual Mode Function Inspection . . . . **09-03A–4**
Automatic Mode Function Inspection . . **09-03A–5**
Automatic Door Glass Return Function Inspection . . . . . **09-03A–5**
IG OFF Timer Function Inspection . . . . **09-03A–6**
Two-step Down Function Inspection . . . **09-03A–7**
**No.1 DOOR GLASS DOES NOT MOVE UP AND DOWN IN AUTOMATIC MODE[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . 09-03A–7**
**No.2 DOOR GLASS DOES NOT REVERSE, EVEN WHEN ENCOUNTERING A FOREIGN OBJECT IN IT IS PATH[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–10**
**No.3 DOOR GLASS REVERSE EVEN WHEN ENCOUNTERING A FOREIGN OBJECT WHILE IT IS MOVING UP IN AUTOMATIC MODE[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–11**
**No.4 ABNORMAL NOISE WHEN THE DOOR GLASS IS OPENING OR CLOSING[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)] . . . . . 09-03A–13**



## FOREWORD[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

id090360805400

- Always perform basic power window system inspection before troubleshooting.
- Troubleshooting procedures provide information unique to malfunctions of the automatic window return function.

## SYMPTOM TROUBLESHOOTING CHART[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

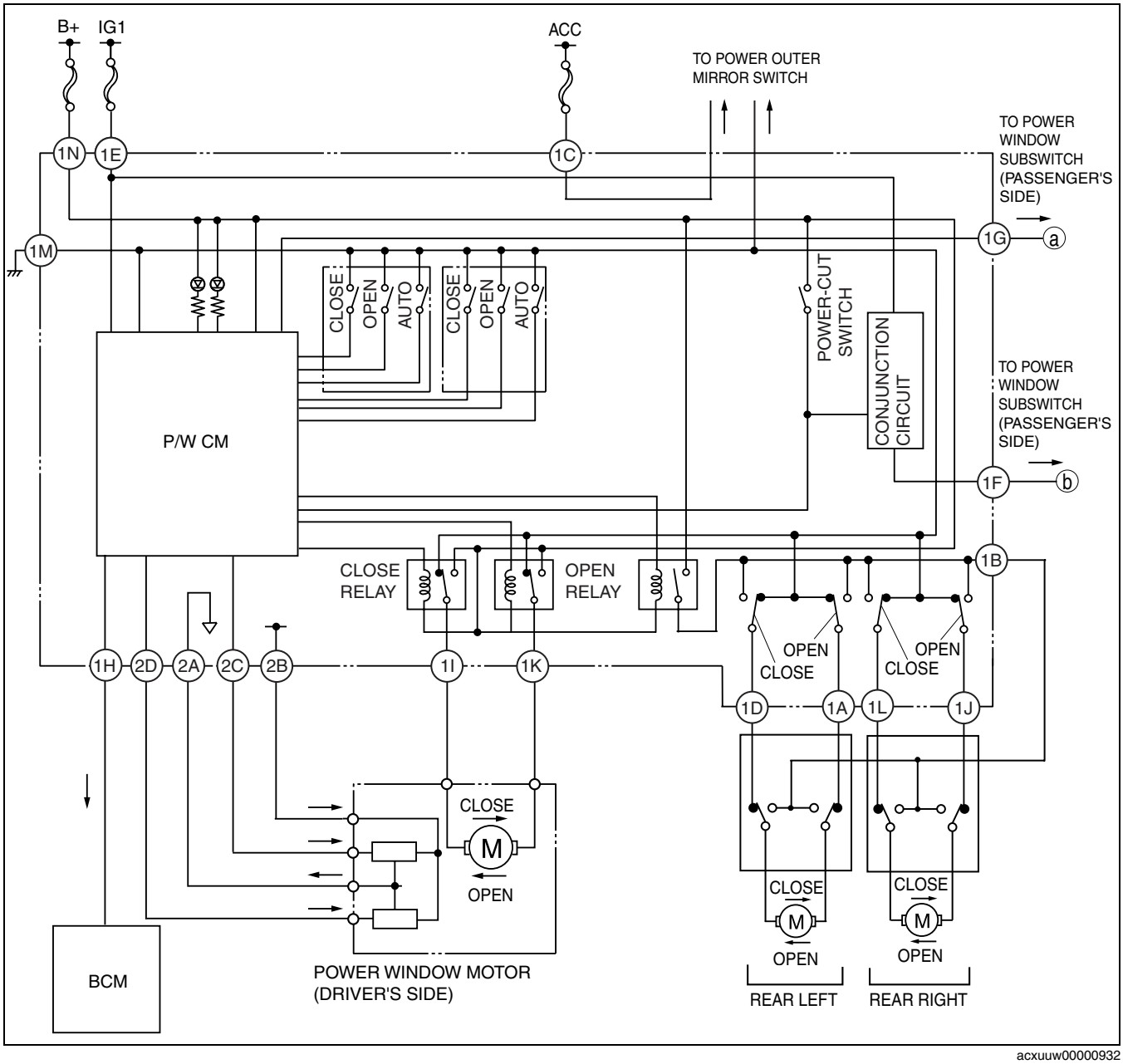
id090360805600

| No. | TROUBLESHOOTING ITEM | PAGE |
|---|---|---|
| 1 | Door glass does not move up and down in automatic mode | (See 09-03A-7 No.1 DOOR GLASS DOES NOT MOVE UP AND DOWN IN AUTOMATIC MODE[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)].) |
| 2 | Door glass does not reverse, even when encountering a foreign object in its path. | (See 09-03A-10 No.2 DOOR GLASS DOES NOT REVERSE, EVEN WHEN ENCOUNTERING A FOREIGN OBJECT IN IT IS PATH[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)].) |
| 3 | Door glass does not reverse, even when encountering a foreign object in its path. | (See 09-03A-11 No.3 DOOR GLASS REVERSE EVEN WHEN ENCOUNTERING A FOREIGN OBJECT WHILE IT IS MOVING UP IN AUTOMATIC MODE[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)].) |
| 4 | Abnormal noise during the power window operation | (See 09-03A-13 No.4 ABNORMAL NOISE WHEN THE DOOR GLASS IS OPENING OR CLOSING[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)].) |

## POWER WINDOW SYSTEM WIRING DIAGRAM[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

id090360805200

### Power Window Main Switch

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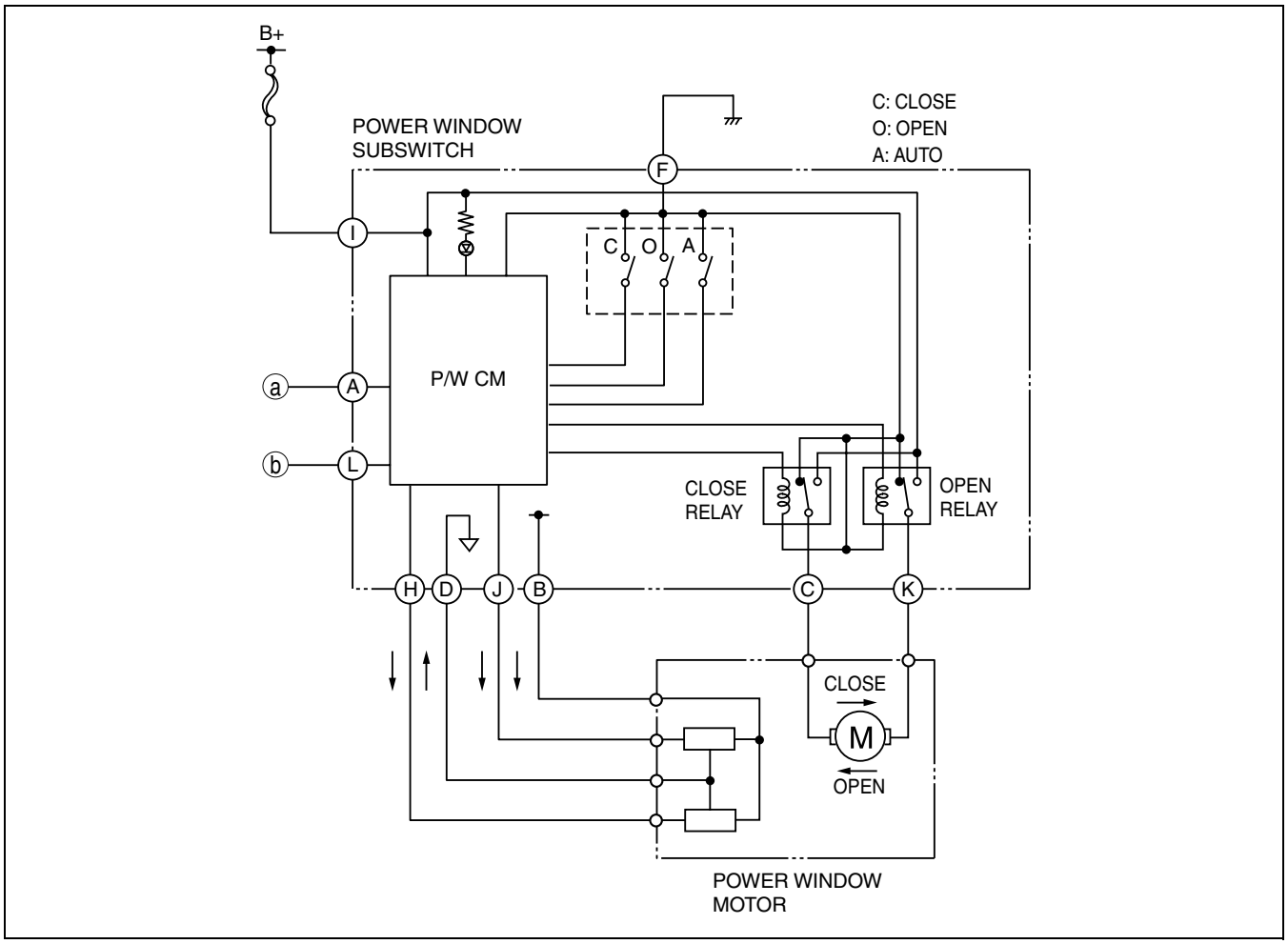
**Power Window Subswitch (Passenger'side)**

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**INTERMITTENT CONCERN TROUBLESHOOTING[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]**

id090360805300

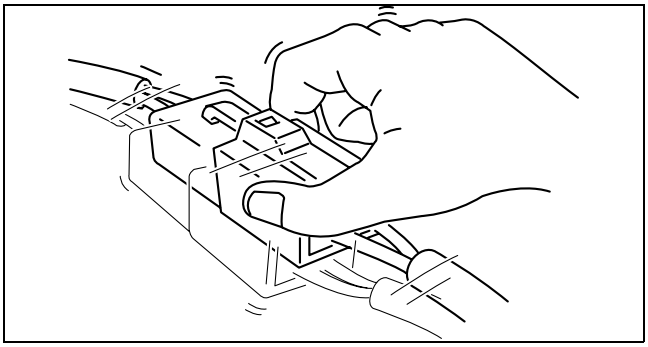
**Vibration Method**

- If a malfunction occurs or becomes worse while driving on a rough road or when the engine is vibrating, perform following the steps:

  **Note**

  - There are several reasons why vehicle or engine vibration could cause an electrical malfunction. Some of the things to inspect for:
    - — Connectors not fully seated.
    - — Wiring harnesses not having full play.
    - — Wires laying across brackets or moving parts.
    - — Wires routed too close to hot parts.
  - An improperly routed, improperly clamped, or loose wiring harness can cause wiring to become pinched between parts.
  - The connector joints, points of vibration, and places where wiring harnesses pass through the firewall, body panels are the major areas to be inspected.

- Inspect for DTCs or malfunctions by slightly shaking wiring harnesses and connectors that are suspected of causing the malfunction.



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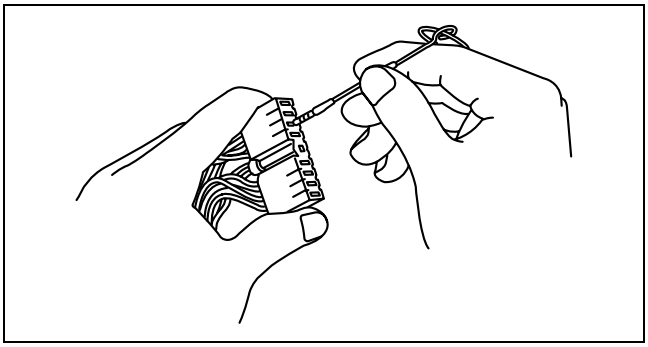
**Connector Terminal Check Method**

1. Inspect the connection condition of each female terminal.
2. Insert the male terminal into the female terminal to inspect for looseness.



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**BASIC POWER WINDOW SYSTEM INSPECTION[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]**

id090360805500

**Manual Mode Function Inspection**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Turn the power-cut switch to UNLOCK.<br>• Does each door glass move up and down in manual mode using the power window subswitch? | Yes | Go to the next step. |
| | | No | • Inspect the following items:<br>— Power window main switch (power-cut switch system malfunction)<br>— Power window subswitch power supply fuses<br>— Power window subswitch ground wiring harness<br>— Power window subswitch power supply wiring harnesses<br>— Wiring harness between power window subswitch and power window motor<br>— Power window subswitch<br>— Power window motor<br>• Repair or replace the malfunctioning part, then go to the next step. |
| 2 | • Does the driver-side door glass move up and down in manual mode using the power window main switch? | Yes | Go to the next step. |
| | | No | • Inspect the following items:<br>— Power window main switch power supply fuses<br>— Power window main switch ground wiring harness<br>— Power window main switch power supply wiring harnesses<br>— Wiring harness between power window main switch and power window motor<br>— Power window main switch<br>• Repair or replace the malfunctioning part, then go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | • Does each other door glass other than the driver-side door glass move up and down in manual mode using the power window main switch? | Yes | Go to the next step. |
| | | No | • Perform the power window initialization procedure procedure for any door glass that does not move up and down, and reinspect. (See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>• If it does not move up and down upon reinspection, inspect the following:<br>— Wiring harness between power window main switch and subswitch<br>• Repair or replace the malfunctioning part, then go to the next step. |
| 4 | • Turn the power-cut switch to LOCK.<br>• Push/pull the power window main switch (switches for all windows in manual mode).<br>• Does only driver-side front door glass move up and down? | Yes | • Manual mode function is normal.<br>• Go to the automatic mode function inspection. |
| | | No | Replace the power window main switch, then go to the automatic mode function inspection (power-cut switch system malfunction). |

**Automatic Mode Function Inspection**

**Note**

- Perform the following inspection for the power window main switch and the power window subswitches for each window.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Operate the power window switch in automatic mode.<br>• Does the door glass move up and down in automatic mode? | Yes | Go to the next step. |
| | | No | • Door glass does not move up and down in automatic mode:<br>— Go to Step 1 of NO. 1 DOOR GLASS DOES NOT MOVE UP AND DOWN IN AUTOMATIC MODE.<br>• Door glass moves up and down in automatic mode, but door glass reverses:<br>— Go to Step 1 of NO. 3 DOOR GLASS REVERSES EVEN THOUGH THE GLASS DOES NOT ENCOUNTER A FOREIGN OBJECT WHILE IT IS MOVING UP IN AUTOMATIC MODE. |
| 2 | • Gently pull the power window switch while the door glass is moving down in automatic mode.<br>• Does the glass stop? | Yes | Go to the next step. |
| | | No | Replace the power window switch, then go to the automatic door glass return function inspection. |
| 3 | • Gently press the power window switch while the door glass is moving up in automatic mode.<br>• Does the glass stop? | Yes | • Automatic mode function is normal.<br>• Go to the automatic door glass return function inspection. |
| | | No | Replace the power window switch, then go to the automatic door glass return function inspection. |

**Automatic Door Glass Return Function Inspection**

**Note**

- Perform the following inspection for the power window main switch and the power window subswitches for each front door window.
- With the switch held at auto-up, the front door glass does not automatically reverse even when a foreign object is encountered.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Lower the door glass completely.<br>• Use the power window switch to close the door glass in automatic mode.<br>• Does the door glass automatically reverse even though the glass does not encounter a foreign object while it is moving up in automatic mode? | Yes | Go to Step 1 of NO. 3 DOOR GLASS REVERSES EVEN THOUGH THE GLASS DOES NOT ENCOUNTER A FOREIGN OBJECT WHILE IT IS MOVING UP IN AUTOMATIC MODE. |
| | | No | Go to the next step. |
| 2 | • Lower the door glass completely.<br>• Take a hammer and hold it against the inside of the top of the window frame so that the door glass will hit its handle when it is closed.<br>• Raise the door glass using automatic mode.<br>• When the door glass hits the hammer handle, does it immediately reverse and move down to **approx. 200 mm {7.87 in}** from the completely closed position? | Yes | • Automatic door glass return function inspection is normal.<br>• Go to the IG OFF timer function inspection. |
| | | No | Go to Step 1 of NO. 2 DOOR GLASS DOES NOT REVERSE, EVEN WHEN ENCOUNTERING A FOREIGN OBJECT IN ITS PATH. |

**IG OFF Timer Function Inspection**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Close all doors.<br>• Turn the ignition switch to the ON position.<br>• In automatic mode, push down the power window main switch for the driver-side front door glass. The door glass should move down **within approx. 43 s** after ignition switch off.<br>• In manual mode (finger continuously depressing the power window main switch), the door glass should move down **within approx. 43 s** after ignition switch off.<br>• Does the driver-side front door glass move down? | Yes | Go to the next step. |
| | | No | • Perform the driver-side power window initialization procedure, and reinspect.(See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>• If it does not move up and down upon reinspection, inspect the following:<br>— Wiring harness for the door open/close signal system<br>— Latch switch<br>• Repair or replace the malfunctioning part, and reinspect.<br>— If operation is not normal, replace the power window main switch, and then go to the next step. |
| 2 | • Turn the ignition switch to the ON position.<br>• In automatic mode, pull up the power window main switch for the driver-side front door glass. The door glass does not move up **within approx. 43 s** after ignition switch off.<br>• Verify that driver-side front door glass does not operate.<br>• Does the driver-side front door glass move up? | Yes | • Perform the driver-side power window initialization procedure, and reinspect.(See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>— If operation is not normal, replace the power window main switch, then go to the next step. |
| | | No | Go to the next step. |
| 3 | • Turn the ignition switch to the ON position.<br>• Lower the driver-side front door glass completely.<br>• Take a hammer and hold it against the inside of the top of the door glass frame so that the door glass will hit its handle when it is closing.<br>• Raise the door glass using manual mode.<br>• When the door glass hits the hammer handle, does it immediately reverse and move down to **approx. 200 mm {7.87 in}** from the completely closed position? | Yes | Go to the next step. |
| | | No | • Perform the driver-side power window initialization procedure, and reinspect.(See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>— If operation is not normal, replace the power window main switch, then go to the next step. |
| 4 | • Open front door.<br>• Turn the ignition switch to the ON position.<br>• Push/pull the power window main switch for the door glass **within approx. 43 s** after ignition switch off.<br>• Verify that the door glass does not move up or down.<br>• Does the door glass move up or down? | Yes | • Inspect the door switch and related wiring harness.<br>• If above parts are normal, replace the power window main switch, then go to the next step.<br>• If the above parts have any malfunction, repair or replace the malfunction part, then go to the next step. |
| | | No | Go to the next step. |
| 5 | • Close front doors.<br>• Turn the ignition switch to the ON position.<br>• Push/pull the power window main switch for door glass after **approx. 60 s** after ignition switch off.<br>• Verify that the door glass does not move up or down.<br>• Does the door glass move up or down? | Yes | • Perform the driver-side power window initialization procedure, and reinspect.(See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>— If operation is not normal, replace the power window main switch, then go to the two-step down function inspection. |
| | | No | • The IG OFF timer function is normal.<br>• Go to the two-step down function inspection. |

**Two-step Down Function Inspection**

- The distance the door glass opens can be changed using the two-step down function (**approx. 20— 100 mm {0.79— 3.93 in}**).
- The two-step down function can be made inoperative. (The function is operative at the initial setting.)
- The two-step down function does not function during IG OFF timer.

**Note**

- Perform the following inspection for the power window main switch and the power window subswitches for each front window.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Raise door glass completely.<br>• When the door glass is lowered using manual mode, does it move down to **approx. 30 mm {1.2 in}** from the completely closed position and stop for **1 s**? (This inspection cannot be performed during IG OFF timer function operation.) | Yes | • Two-step down function is normal.<br>• Reinspect malfunction symptoms. |
| | | No | • Perform the power window initial setting procedure and verify auto-up/down operation.(See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>— If the automatic function does not operate, go to Automatic Door Glass Return Function Inspection.<br>— If the automatic function operates but the two-step down function does not, replace the power window switch. |

## No.1 DOOR GLASS DOES NOT MOVE UP AND DOWN IN AUTOMATIC MODE[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

id090360805700

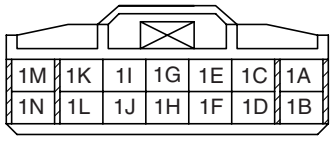
**Note**

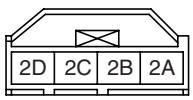
- Perform the following inspection for the power window system component parts of windows where the front door glass cannot be operated automatically.

09-03A

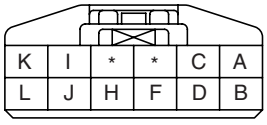
| 1 | Door glass does not move up and down in automatic mode |
|---|---|
| POSSIBLE CAUSE | • Open circuit or short to power supply in sensor 1 signal, ground signal from wiring harness (between power window switch and power window motor), inner power window switch, or inner motor: Steps 3–6<br>• Open circuit or short to power supply/ground in sensor 2 signal from wiring harness (between power window switch and power window motor), inner power window switch, or inner motor: Steps 7–11<br><br>**Note**<br>• The automatic function and the IG OFF timer function do not operate while the power window switch is in fail-safe mode. The fail-safe operates when sensor 1, and/or sensor 2, and/or the sensor power supply malfunctions.<br>• Sensor 1 and/or 2 malfunction<br>— When the door glass is moving up and down, the power window switch cannot sense a pulse signal from sensor 1 during the time it senses 5 pulses (2.5 cycles) from sensor 2.<br>— When the door glass is moving up and down, the switch cannot sense a pulse signal from sensor 2 during the time it senses 5 pulses (2.5 cycles) from sensor 1.<br>— There are three abnormal pulses in a pulse signal while the door glass is moving up or down.<br>— There are 20 cycle pulses from a closed position while the door glass is moving up.<br>— There is no pulse signal for 1 s after the door glass is moved down. |

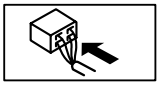
POWER WINDOW MAIN SWITCH WIRING HARNESS-SIDE CONNECTOR



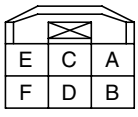




POWER WINDOW PASSENGER'S SUBSWITCH WIRING HARNESS-SIDE CONNECTOR



POWER WINDOW MOTOR WIRING HARNESS-SIDE CONNECTOR



**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT WHETHER POWER WINDOW SWITCH ENTERS FAIL-SAFE MODE OR NOT**<br>• Did the door glass move up or down in automatic mode? | Yes | Reinspect malfunction symptoms. |
| | | No | Go to the next step. (Power window switch may enter fail-safe mode.) |
| 2 | **VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW SWITCH AND FRONT POWER WINDOW MOTOR) OR ELSEWHERE**<br>• Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following front power window switch terminals (sensor 1 signal):<br>— Driver's side (at main switch): 2C<br>— Passenger's side (at sub-switch): J<br>• Does the voltage alternate between **0 V** and **approx. 12 V** when the door glass is moving up and down? | Yes | Go to Step 7. |
| | | No | Go to the next step. |
| 3 | **VERIFY SENSOR 1 OUTPUT SIGNAL**<br>• Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following front power window motor terminals (sensor 1 signal):<br>— Driver's side: A<br>— Passenger's side: A<br>• Is the voltage alternate between **0 V** and **approx. 12 V** when the door glass is moving up and down in manual mode? | Yes | Go to the next step. |
| | | No | Replace the power window motor, then go to Step 12. |
| 4 | **INSPECT WIRING HARNESS BETWEEN POWER WINDOW SWITCH AND POWER WINDOW MOTOR FOR CONTINUITY**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the power window switch connector.<br>• Is there continuity between the following front power window switch terminals and front power window motor terminals?<br>— Driver's side (at main switch— power window motor):<br>• 2C— A (sensor 1 signal)<br>• 2B— D (sensor power supply)<br>• 2A— C (ground signal)<br>— Except driver's side (at sub-switch— power window motor):<br>• J— A (sensor 1 signal)<br>• B— D (sensor power supply)<br>• D— C (ground signal) | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the power window switch and power window motor, then go to Step 12. |
| 5 | **VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW SWITCH AND POWER WINDOW MOTOR) OR POWER WINDOW SWITCH**<br>• Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following power window switch terminals:<br>— Driver's side (at main switch)<br>• 2C (sensor 1 signal)<br>• 2A (ground signal)<br>— Passenger's side (at sub-switch)<br>• C (sensor 1 signal)<br>• I (ground signal)<br>• Is the voltage **approx. 12 V**? | Yes | Repair the wiring harness between the suspect power window switch and power window motor, then go to Step 12. |
| | | No | Replace the suspect power window switch (open circuit or short to power supply in power window switch). |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 6 | **VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW SWITCH AND POWER WINDOW MOTOR) OR ELSEWHERE**<br>• Is there continuity between the following power window switch terminals (wiring harness-side) and ground?<br>— Driver's side (at main switch)<br>• 2C (sensor 1 signal)<br>• 2B (sensor power supply)<br>— Passenger's side (at sub-switch)<br>• J (sensor 1 signal)<br>• B (sensor power supply) | Yes | Replace the wiring harness between the power window switch and power window motor, then go to Step 12. |
| | | No | Go to the next step. |
| 7 | **VERIFY WHETHER MALFUNCTION IS IN POWER WINDOW SWITCH OR ELSEWHERE**<br>• Turn the ignition switch to the ON position.<br>• Inspect the voltage at the following power window switch terminals (sensor 2 signal):<br>— Driver's side (at main switch): 2D<br>— Passenger's side (at sub-switch) : H<br>• Does the voltage alternate between **0 V** and **approx. 12 V** when the door glass is moving up and down? | Yes | Replace the power window switch (malfunction in power window switch automatic mode control), then go to Step 11. |
| | | No | Go to the next step. |
| 8 | **VERIFY SENSOR 2 OUTPUT SIGNAL**<br>• Turn the ignition switch to the ON position.<br>• Inspect the voltage at power window motor terminal B (sensor 2 signal).<br>• Does the voltage alternate between **0 V** and **approx. 12 V** when door glass is moving up and down? | Yes | Go to the next step. |
| | | No | Replace the power window motor, then go to Step 12. |
| 9 | **VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW SWITCH AND POWER WINDOW MOTOR) OR ELSEWHERE**<br>• Turn the ignition switch to the LOCK position.<br>• Disconnect the power window switch connector and power window motor connector.<br>• Is there continuity between the following power window switch terminals and power window motor terminals?<br>— Driver's side (at main switch— power window motor): 2D and B<br>— Passenger's side (at sub-switch— power window motor): H and B | Yes | Go to the next step. |
| | | No | Repair the wiring harness between the power window switch and power window motor, then go to Step 12. |
| 10 | **VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW SWITCH AND POWER WINDOW MOTOR) OR ELSEWHERE**<br>• Is there continuity between the following power window switch terminals (sensor 2 signal) and ground?<br>— Driver's side (at main switch): 2D<br>— Except driver's side (at sub-switch) : H | Yes | Repair the wiring harness between the power window switch and power window motor, then go to Step 12. |
| | | No | Go to the next step. |
| 11 | **VERIFY WHETHER MALFUNCTION IS IN WIRING HARNESS (BETWEEN POWER WINDOW SWITCH AND POWER WINDOW MOTOR) OR POWER WINDOW SWITCH**<br>• Turn the ignition switch to the ON position.<br>• Measure the voltage at the following power window switch terminals (sensor 2 signal):<br>— Driver's side (at main switch): 2D<br>— Except driver's sideat (at sub-switch): H<br>• Is the voltage **approx. 12 V**? | Yes | Repair the wiring harness between the power window switch and front driver-side power window motor, then go to the next step. |
| | | No | Replace the power window switch (open circuit or short to power supply/ground in power window switch), then go to the next step. |
| 12 | **REINSPECT MALFUNCTION SYMPTOM AFTER REPAIR**<br>• Is malfunction no longer present? | Yes | • Troubleshooting completed.<br>• Explain repairs to the customer. |
| | | No | Reinspect malfunction symptoms, then repeat from Step 1 if malfunction recurs. |

## No.2 DOOR GLASS DOES NOT REVERSE, EVEN WHEN ENCOUNTERING A FOREIGN OBJECT IN IT IS PATH[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

id090360809800

**Note**

- Perform the following inspection for the power window system component parts of the windows where the door glass does not reverse, even when encountering a foreign object in its path.

| 2 | **Door glass does not reverse, even when encountering a foreign object in its path.** |
|---|---|
| **POSSIBLE CAUSE** | • Automatic window return range did not reset after battery disconnection: Step 2 |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **VERIFY CUSTOMER COMPLAINT**<br>• Did the customer complain that the door glass did not reverse when near complete closed position? | Yes | • The system is normal.<br>• Explain to the customer that automatic window return power window system does not operate when near complete closed position. |
| | | No | Go to the next step. |
| 2 | **RESET REVERSE AREA STORED IN DOOR GLASS MOTOR**<br>• Perform the power window initialization procedure.<br>• Did malfunction disappear? | Yes | • Troubleshooting completed.<br>• Explain to the customer that misadjustment of automatic window return range was the problem. |
| | | No | Replace the power window switch.<br>• Verify auto-up/down operation and if the automatic function does not operate, go to Step 1 of NO. 1 DOOR GLASS DOES NOT MOVE UP AND DOWN IN AUTOMATIC MODE.<br>• If the automatic function operates, replace the power window switch. |

## No.3 DOOR GLASS REVERSE EVEN WHEN ENCOUNTERING A FOREIGN OBJECT WHILE IT IS MOVING UP IN AUTOMATIC MODE[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

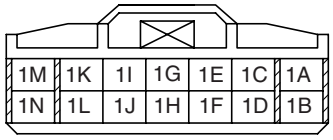
id090360809900

**Note**

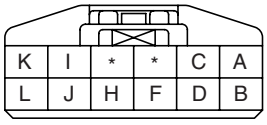
- Perform the following inspection for the power window system component parts of windows where the door glass reverses even though the glass does not encounter a foreign object while it is moving up in automatic mode.

| 3 | **Door glass reverses even though the glass does not encounter a foreign object while it is moving up in automatic mode.** |
|---|---|
| **POSSIBLE CAUSE** | • Extreme change in the sliding resistance of the glass while the door glass is closing.<br>— Improper installation of the acrylic door visor.<br>— Power window motor malfunction<br>— Object caught between the glass run channel and the door glass.<br>— Insufficient tightening of the door glass to the carrier plate.<br>— Glass run channel malfunction.<br>— Glass guide related malfunction.<br><br>**Note**<br>• The auto-reverse pinch protection function is a mechanism that automatically reverses (opens) the door glass while it is closing when the power window main switch detects the signal from the power window motor indicating that an object is obstructing the door glass movement.<br>• The auto-reverse pinch protection function may operate if the sliding resistance of the door glass increases causing the closing speed to decrease.<br>• If the door glass closing speed has changed, concentrate the inspection on the following locations: (Slip occurrence)<br>— If the door glass is slipping forward, inspect the front side of the glass guide or glass run channel.<br>— If the door glass is slipping rearward, inspect the rear side of the glass guide or glass run channel. |

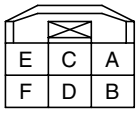
POWER WINDOW MAIN SWITCH WIRING HARNESS-SIDE CONNECTOR

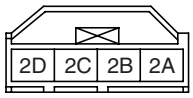


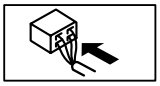

POWER WINDOW PASSENGER'S SUBSWITCH WIRING HARNESS-SIDE CONNECTOR




POWER WINDOW MOTOR WIRING HARNESS-SIDE CONNECTOR



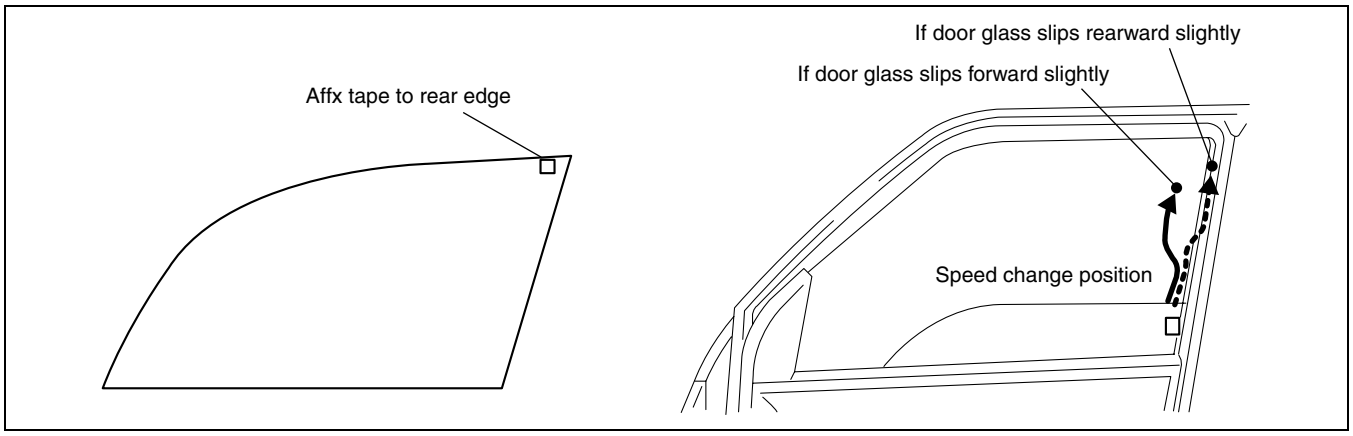



09-03A

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT MALFUNCTION SYMPTOM**<br>• Does the malfunction symptom occur only under the following special conditions?:<br>— Driving over railroad tracks<br>— Driving on bumpy roads.<br>— Opening/closing the door. | Yes | The system is normal<br>(Explain to the customer that this does not indicate a malfunction because the system is designed to reverse the door glass while it is closing if it receives vibration when the vehicle is crossing railroad tracks, driving on a bumpy road, or when the door is opened/closed.) |
| | | No | Go to the next step. |
| 2 | **INSPECT ACRYLIC DOOR VISOR INSTALLATION CONDITION**<br>• Is the acrylic door visor normal? | Yes | Go to the next step. |
| | | No | Install the side visor properly, then go to the next step. |
| 3 | **INSPECT DOOR GLASS CLOSING SPEED**<br>• Affix tape to the rear edge of the door glass as shown in the figure for placing marks (to facilitate seeing the door glass movement)<br>• Start the engine and idle it (to ensure a stabilized operational voltage).<br>• Does the door glass hesitate only once while its closing? | Yes | Mark the point where the door glass closing speed changed, then go to Step 5. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | **REINSPECT DOOR GLASS CLOSING SPEED**<br>• Does the door glass hesitate periodically (5-6 times) while it is closing? | Yes | Replace the power window motor, then go to Step 8 (See 09-12-7 POWER WINDOW MOTOR REMOVAL/ INSTALLATION.) |
| | | No | Go to Step 8. |
| 5 | **INSPECT GLASS RUN CHANNEL AND DOOR GLASS SLIDING SURFACE**<br>• Is there an object caught between the glass run channel and the door glass, or is there roughness on the sliding surface (rubber surface)? | Yes | **Object is caught between glass run channel and door glass:**<br>• Remove the object.<br>**Roughness on the sliding surface (rubber surface):**<br>• Replace the glass run channel.<br>After performing one of the above actions, reinspect.<br>If the malfunction is not corrected, go to Step 3. |
| | | No | Go to the next step. |
| 6 | **INSPECT TIGHTENING OF DOOR GLASS TO CARRIER PLATE**<br>• Is it normal? | Yes | Go to the next step. |
| | | No | After tightening correctly, reinspect.<br>If the malfunction is not corrected, go to Step 3. |
| 7 | **INSPECT CONDITION OF GLASS RUN CHANNEL AND DOOR GLASS**<br>• Is it normal? | Yes | Go to the next step. |
| | | No | Assemble the glass run channel and door glass securely, and reinspect.<br>If the malfunction is not corrected, go to Step 3. |
| 8 | **INSPECT DOOR GLASS CLOSING SPEED**<br>• Does the door glass hesitate at any location? | Yes | Repeat the inspection from Step 3. |
| | | No | Troubleshooting completed. |

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## No.4 ABNORMAL NOISE WHEN THE DOOR GLASS IS OPENING OR CLOSING[POWER WINDOW SYSTEMS (AUTO-OPEN/CLOSE FUNCTION)]

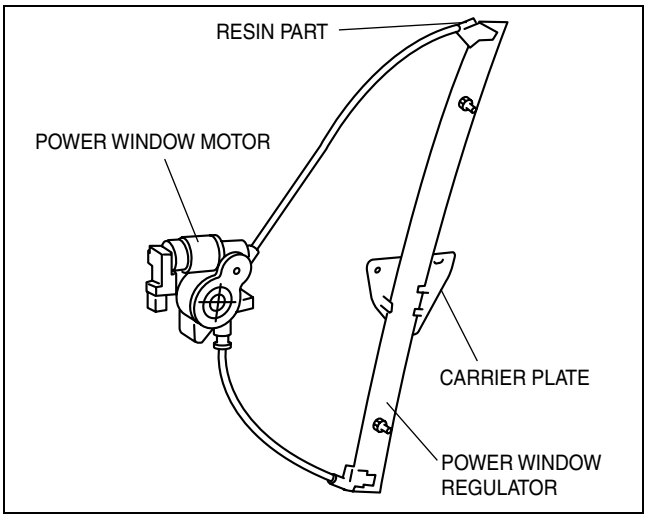
id090360810000

| 4 | Abnormal noise when the door glass is opening or closing |
|---|---|
| POSSIBLE CAUSE | • Installation screw is loose between the door glass and carrier plate.<br>• Deformity in the power window regulator plastic part due to use.<br>— Scratching, wear marks to the power window regulator resin part due to twisting of the cable.<br>— Gear deformity in the power window motor.<br><br>**Note**<br>• Identify the location of the noise using a stethoscope or similar device. |

### Diagnostic procedure

| Noise type | Time of occurrence | Possible cause | Location of noise | Action |
|---|---|---|---|---|
| Clanking noise | Door glass begins to move | Insufficiently tightened installation screw between the door glass and carrier plate. | Between door glass lower edge and carrier plate. | Securely tighten the installation screw. |
| Groaning noise (Sound increases due to use) | While door glass is operating | Vibration caused by wear on the resin part from cable twisting due to use of the power window regulator.<br><br>**Note**<br>• Noise does not occur if a roller is equipped to power window regulator resin part. | Power window regulator | Replace the power window regulator (See 09-12-5 FRONT POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.) (See 09-12-6 REAR POWER WINDOW REGULATOR REMOVAL/ INSTALLATION.) |
| Whining noise | | Gear inside power window motor is deformed due to use. | Gear in power window motor | Replace the power window motor (See 09-12-7 POWER WINDOW MOTOR REMOVAL/ INSTALLATION.) |
| Clicking noise (Periodic noise) | | | | |



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# 09-03B SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

QUICK DIAGNOSTIC CHART[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)] . . . . . 09-03B–2
No.1 UNABLE TO COMMUNICATE WITH GENERIC ELECTRONIC MODULE (GEM)[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)] . . . . . 09-03B–3
No.2 DOOR GLASS DOES NOT OPERATE USING THE KEYLESS TRANSMITTER[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)] . . . . . 09-03B–3
No.3 DOOR GLASS DOES NOT OPERATE USING THE REQUEST SWITCH[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)] . . . . . 09-03B–4
No.4 PASSENGER'S DOOR GLASS DOES NOT OPERATE[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]. . . . . 09-03B–5
No.5 DOOR GLASS STOPS BEFORE FULLY OPENING/CLOSING[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]. . . . . 09-03B–5
No.6 DOOR GLASS REVERSES BEFORE IT FULLY OPENS [POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)] . . . . . 09-03B–6
No.7 DRIVER'S AND PASSENGER'S DOOR GLASSES OPERATE ACCIDENTALLY[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)] . . . . . 09-03B–7
No.8 PASSENGER'S DOOR GLASS OPERATES ACCIDENTALLY[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]. . . . . 09-03B–7

# SYMPTOM TROUBLESHOOTING [POWER WINDOW SYSTEMS (EXTERIOR OPEN/ CLOSE FUNCTION)]

## QUICK DIAGNOSTIC CHART[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361808500

X: Applied

| Troubleshooting item / Possible factor | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| | Door glass does not operate even though various operations are performed | Door glass does not operate using the keyless transmitter | Door glass does not operate using the request switch | Passenger's door glass do not operate | Door glass stops before fully opening/closing | Door glass reverses before it fully opens | Driver's and passenger's door glasses operate accidentally | Passenger's door glass operates |
| Power window main switch malfunction | X | | | | X | | X | |
| Power window subswitch (passenger's) malfunction | | | | X | X | | X | X |
| Power window motor malfunction | X | | | X | X | X | | |
| Battery malfunction (low voltage) | X | | | X | X | X | | |
| Power window system initial setting error | X | | | X | X | | | |
| Open circuit in wiring harness between power window main switch and BCM | X | | | | | | | |
| BCM malfunction | X | X | X | | X | | X | |
| Advanced keyless control module malfunction | | | X | | | | | |
| Keyless control module malfunction | | X | X | | | | | |
| Open circuit in wiring harness between keyless receiver and BCM | | X | X | | | | | |
| Any door or liftgate is open. | | X | X | | | | | |
| Key is inserted in steering lock. | | X | X | | | | | |
| Open circuit in wiring harness between request switch and keyless control module. | | | X | | | | X | |
| Start knob is in a position other than LOCK position. | | | X | | | | | |
| Open circuit in wiring harness between power window main switch and power window subswitch | | | | X | | | X | |
| Improper installation of door glass | | | | | X | X | | |
| Keyless entry system signal reception error (outside operation area, radio signal interference) | | | | | X | | | |
| Transmitter malfunction | | | | | | | X | |
| Request switch malfunction | | | | | | | X | |
| Power window main switch malfunction | | | | | | | X | |
| Power window subswitch malfunction | | | | | | | X | X |

acxuuw00000957

**Note**

- The exterior open/close function does not operate when the following conditions are met.
  - — Any door or liftgate is open.
  - — The key is inserted in the steering lock.
  - — The start knob is not in the LOCK position.
- The auto-open/close function (the exterior open/close function) does not operate if the power window initialization procedure has been reset.
- Depending on the temperature and battery conditions, the window may reverse on rare occasions.

### No.1 UNABLE TO COMMUNICATE WITH GENERIC ELECTRONIC MODULE (GEM)[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361808600

| 1 | Door glass does not operate even though various operations are performed |
|---|---|
| POSSIBLE CAUSE | • Power window main switch malfunction<br>• Power window motor malfunction<br>• Battery malfunction (low voltage)<br>• power window initialization procedure error<br>• Open circuit in wiring harness between power window main switch and BCM<br>• BCM malfunction |

**Diagnostic Procedure**

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | • Inspect the operation of the door glass by operating the power window main switch.<br>• Is the manual operation normal? | Yes | Go to the next step. |
| | | No | Inspect the following parts, and repair or replace.<br>• Power window main switch (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)<br>• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Battery (Low voltage) |
| 2 | • Inspect the operation of the door glass by operating the power window main switch.<br>• Does the door glass operate in auto? | Yes | Go to the next step. |
| | | No | Perform the power window initialization procedure. (See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.) |
| 3 | • Does the door lock/unlock normally? | Yes | Inspect the wiring harness between the power window main switch and the BCM.<br>If there is any malfunction, repair or replace the applicable part. |
| | | No | Replace the BCM.<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.) |



### No.2 DOOR GLASS DOES NOT OPERATE USING THE KEYLESS TRANSMITTER[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361808700

| 2 | DOOR GLASS DOES NOT OPERATE USING THE KEYLESS TRANSMITTER |
|---|---|
| POSSIBLE CAUSE | • Keyless control module malfunction<br>• BCM malfunction<br>• Open circuit in wiring harness between keyless control module and BCM<br>• Any door or liftgate is open<br>• Key is inserted in steering lock |

**Diagnostic Procedure**

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | • Inspect the door lock/unlock operation using the transmitter.<br>• Does it operate normally? | Yes | Inspect the following parts, and repair or replace.<br>• BCM (See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.)<br>• Keyless control module (Vehicles with advanced keyless system) (See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].) |
| | | No | Go to the next step. |
| 2 | • Inspect the open/close condition of the doors and the liftgate.<br>• Is the reason why they do not lock/unlock because a door or the liftgate is open? | Yes | System is normal (Does not operate when a door or the liftgate is open). |
| | | No | Go to the next step. |
| 3 | • Verify whether the key is in the steering lock.<br>• Is the reason why they do not lock/unlock because the key is inserted in the steering lock? | Yes | System is normal (Does not operate when the key is inserted in the steering wheel lock) |
| | | No | Go to the next step. |

| Step | Inspection | | Action |
|---|---|---|---|
| 4 | • When the lock/unlock operation does not operate for reasons other than the above Steps 2 and 3. | Yes | Inspect the following parts, and repair or replace.<br>• Keyless control module (See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>• Wiring harness between keyless control module and BCM. |
| | | No | Reinspect for malfunction recurrence.If the malfunction is not corrected, repeat the procedure from Step 1. |

### No.3 DOOR GLASS DOES NOT OPERATE USING THE REQUEST SWITCH[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361808800

| 3 | Door glass does not operate using the request switch |
|---|---|
| POSSIBLE CAUSE | • Keyless control module malfunction<br>• BCM malfunction<br>• Open circuit in wiring harness between request switch and keyless control module.<br>• Any door or liftgate is open.<br>• Key is inserted in steering lock.<br>• Start knob is in a position other than LOCK position. |

**Diagnostic Procedure**

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | • Verify the door lock/unlock operation by operating the request switch.<br>• Does it operate normally? | Yes | Inspect the following parts, and repair or replace.<br>• Keyless control module (See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>• BCM (See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.) |
| | | No | Go to the next step. |
| 2 | • Verify the open/close condition of the doors and the liftgate.<br>• Is the reason why they do not lock/unlock because a door or the liftgate is open? | Yes | The system is normal (When any door or the liftgate is open, the system does not operate). |
| | | No | Go to the next step. |
| 3 | • Verify the start knob position, or if the key is in the steering lock.<br>• Is the reason why the door lock/unlock does not operate because the start knob is in a position other than LOCK, or the key is inserted? | Yes | The system is normal (When the start knob is in a position other than LOCK, or the key is inserted in the steering lock, the system does not operate). |
| | | No | Go to the next step. |
| 4 | • The door lock/unlock does not operate for reasons other than Steps 2 and 3 above. | Yes | Inspect the following parts, and repair or replace.<br>• Keyless control module (See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>• Wiring harness between the request switch and the keyless control module. |
| | | No | Reinspect for malfunction recurrence.If the malfunction is not corrected, repeat the procedure from Step 1. |

### No.4 PASSENGER'S DOOR GLASS DOES NOT OPERATE[POWER WINDOW SYSTEMS (EXTERIOR OPEN/ CLOSE FUNCTION)]

id090361829100

| 4 | Passenger's door glass does not operate |
|---|---|
| POSSIBLE CAUSE | • Power window subswitch (passenger's) malfunction<br>• Power window motor malfunction<br>• Battery malfunction (low voltage)<br>• Open circuit in wiring harness between power window main switch and power window subswitch (passenger's)<br>• power window initialization procedure error |

**Diagnostic Procedure**

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | • Inspect the door glass operation by operating the power window subswitch (passenger's).<br>• Does it operate normally? | Yes | Go to the next step. |
| | | No | Inspect the following parts, and repair or replace.<br>• Power window subswitch (passenger's) (See 09-12-11 POWER WINDOW SUBSWITCH INSPECTION.)<br>• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Battery (Low voltage) |
| 2 | • Inspect the door glass operation by operating the power window subswitch (passenger's).<br>• Does it operate in auto? | Yes | Inspect the wiring harness between the power window main switch and the power window subswitch (passenger's).<br>If there is any malfunction, repair or replace the applicable part. |
| | | No | Perform the power window initialization procedure. (See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.) |



### No.5 DOOR GLASS STOPS BEFORE FULLY OPENING/CLOSING[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361809000

| 5 | DOOR GLASS STOPS BEFORE FULLY OPENING/CLOSING |
|---|---|
| POSSIBLE CAUSE | • Power window main switch malfunction<br>• Power window subswitch (passenger's) malfunction<br>• Power window motor malfunction<br>• Battery malfunction (Low voltage)<br>• Door glass improper installation<br>• power window initialization procedure error<br>• Keyless control module malfunction<br>• BCM malfunction<br>• Keyless entry system signal reception error (outside operation area, radio signal interference) |

**Diagnostic Procedure**

| Step | Inspection | | Action |
|---|---|---|---|
| 1 | • Operate the door glass in auto/manual by operating the power window main switch/power window subswitch (passenger's).<br>• Does the door glass stop before fully opening/ closing using either operation? | Yes | Inspect the following parts, and repair or replace.<br>• Power window main switch (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)<br>• Power window subswitch (passenger's) (See 09-12-11 POWER WINDOW SUBSWITCH INSPECTION.)<br>• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Battery (Low voltage)<br>• Door glass (Installation condition) |
| | | No | Go to the next step. |
| 2 | • Inspect the operation of the door glass by repeating Step 1 above.<br>• Does the door glass stop before fully opening/ closing while in auto operation? | Yes | Perform the power window initialization procedure. (See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.) |
| | | No | Go to the next step. |

| Step | Inspection | | Action |
|---|---|---|---|
| 3 | • Open the door glass by operating the transmitter.<br>• Does the door glass stop before fully opening? | Yes | Inspect the following parts, and repair or replace.<br>• Keyless control module (Vehicles with advanced keyless system) (See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>• BCM (See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.) |
| | | No | Go to the next step. |
| 4 | • Close the door glass by operating the transmitter.<br>• Does the door glass stop before fully closing? | Yes | Inspect the following parts, and repair or replace.<br>• Keyless control module (Vehicle with advanced keyless system) (See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>• BCM (See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.)<br>• Keyless entry system signal reception error (outside operation area, radio signal interference) |
| | | No | Reinspect for malfunction recurrence.If the malfunction is not corrected, repeat the procedure from Step 1. |

### No.6 DOOR GLASS REVERSES BEFORE IT FULLY OPENS[POWER WINDOW SYSTEMS (EXTERIOR OPEN/ CLOSE FUNCTION)]

id090361809100

| 6 | Door glass reverses before it fully opens |
|---|---|
| POSSIBLE CAUSE | • Malfunction in power window motor<br>• Malfunction in battery<br>• Improper installation of door glass |

**Diagnostic procedure**

| Step | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • By operating a power window main switch / power window subswitch (passenger's), operate the door glass.<br>• Does the door glass mis-reverse? | Yes | Inspect the power window motor and repair or replace it. (See 09-12-7 POWER WINDOW MOTOR INSPECTION.) |
| | | No | Inspect the following parts and repair or replace them.<br>• Power window motor (See 09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Battery (brownout)<br>• Door glass (improper installation)<br>**Note**<br>• Depending on the temperature, battery, and voltage condition, the door glass may mis-reverse. |

### No.7 DRIVER'S AND PASSENGER'S DOOR GLASSES OPERATE ACCIDENTALLY[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361811100

| 7 | Driver's and passenger's door glasses operate accidentally |
|---|---|
| POSSIBLE CAUSE | • Transmitter malfunction<br>• Request switch malfunction<br>• Open or short circuit in wiring harness between request switch (each door) and keyless control module.<br>• Power window main switch malfunction<br>• Power window subswitch (passenger's) malfunction<br>• Open or short circuit in wiring harness between power window main switch and power window subswitch (passenger's)<br>• BCM malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect if malfunction is in operating by transmitter | Yes | Inspect the transmitter. |
| | | No | **With keyless entry system**<br>• Go to Step 3.<br>**With advanced keyless system**<br>• Go to the next step. |
| 2 | • Inspect if malfunction is in operating by request switch | Yes | Inspect the following parts and repair or replace.<br>• Request switch (See 09-14-40 REQUEST SWITCH INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>• Wiring harness between request switch and keyless control module |
| | | No | Go to the next step. |
| 3 | • Inspect if malfunction is in operating power window main switch | Yes | Inspect power window main switch (See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.) |
| | | No | Go to the next step. |
| 4 | • Inspect if malfunction is in without operating Step1to 3 | Yes | Inspect the following parts and repair or replace<br>• Power window subswitch (passenger's) (See 09-12-11 POWER WINDOW SUBSWITCH INSPECTION.)<br>• BCM (See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.)<br>• Wiring harness between power window subswitch (passenger's) and power window main switch |
| | | No | Reinspect for malfunction recurrence.If the malfunction is not corrected, repeat the procedure from Step 1. |

### No.8 PASSENGER'S DOOR GLASS OPERATES ACCIDENTALLY[POWER WINDOW SYSTEMS (EXTERIOR OPEN/CLOSE FUNCTION)]

id090361809500

| 8 | Passenger's door glass operates accidentally |
|---|---|
| POSSIBLE CAUSE | • Power window subswitch (passenger's) malfunction |

**Diagnostic procedure**

| ACTION |
|---|
| Inspect the power window subswitch of the passenger's door glass and repair or replace (See 09-12-11 POWER WINDOW SUBSWITCH INSPECTION.) |

# 09-03C SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER]

SYMPTOM TROUBLESHOOTING [INSTRUMENT CLUSTER] . . . . . 09-03C–1
QUICK DIAGNOSTIC CHART [INSTRUMENT CLUSTER] . . . . . 09-03C–2
NO. 1 FUEL GAUGE NEEDLE POSITION INCORRECT [INSTRUMENT CLUSTER] . . . . . 09-03C–3
NO. 2 ALL METERS AND GAUGES DO NOT OPERATE [INSTRUMENT CLUSTER] . . . . . 09-03C–3
NO. 3 ABS WARNING LIGHT ILLUMINATES[INSTRUMENT CLUSTER] . . . . . 09-03C–4
NO. 4 MIL ILLUMINATES[INSTRUMENT CLUSTER] . . . . . 09-03C–5
NO. 5 BRAKE SYSTEM WARNING LIGHT ILLUMINATES [INSTRUMENT CLUSTER] . . . . . 09-03C–5
NO. 6 INSTRUMENT CLUSTER ILLUMINATION DOES NOT ILLUMINATE [INSTRUMENT CLUSTER] . . . . . 09-03C–6
NO. 7 SPEEDOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER] . . . . . 09-03C–7
NO. 8 TACHOMETER INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER] . . . . . 09-03C–8
NO. 9 WATER TEMPERATURE GAUGE INDICATION IS DEFECTIVE [INSTRUMENT CLUSTER] . . . . . 09-03C–9

## SYMPTOM TROUBLESHOOTING[INSTRUMENT CLUSTER]

id0903d5807200

| No. | TROUBLESHOOTING ITEM | PAGE |
|---|---|---|
| 1 | Fuel gauge needle position incorrect | (See 09-03C-3 NO. 1 FUEL GAUGE NEEDLE POSITION INCORRECT[INSTRUMENT CLUSTER].) |
| 2 | All meters and gauges do not operate | (See 09-03C-3 NO. 2 ALL METERS AND GAUGES DO NOT OPERATE[INSTRUMENT CLUSTER].) |
| 3 | ABS warning light illuminates | (See 09-03C-4 NO. 3 ABS WARNING LIGHT ILLUMINATES[INSTRUMENT CLUSTER].) |
| 4 | MIL illuminates | (See 09-03C-5 NO. 4 MIL ILLUMINATES[INSTRUMENT CLUSTER].) |
| 5 | Brake system warning light illuminates | (See 09-03C-5 NO. 5 BRAKE SYSTEM WARNING LIGHT ILLUMINATES[INSTRUMENT CLUSTER].) |
| 6 | Instrument cluster illumination does not illuminate | (See 09-03C-6 NO. 6 INSTRUMENT CLUSTER ILLUMINATION DOES NOT ILLUMINATE[INSTRUMENT CLUSTER].) |
| 7 | Speedometer indication is defective | (See 09-03C-7 NO. 7 SPEEDOMETER INDICATION IS DEFECTIVE[INSTRUMENT CLUSTER].) |
| 8 | Tachometer indication is defective | (See 09-03C-8 NO. 8 TACHOMETER INDICATION IS DEFECTIVE[INSTRUMENT CLUSTER].) |
| 9 | Water temperature gauge indication is defective | (See 09-03C-9 NO. 9 WATER TEMPERATURE GAUGE INDICATION IS DEFECTIVE[INSTRUMENT CLUSTER].) |

## QUICK DIAGNOSTIC CHART[INSTRUMENT CLUSTER]

id0903d5807300

X: Applicable

| No. | Troubleshooting item / Possible factor | Poor connection of fuel gauge sender unit connector, terminal damage | Poor connection of instrument cluster connector, terminal damage | Fuel gauge sender unit | Instrument cluster | Fuel gauge sender unit is improperly installed | Open or short circuit in wiring harness between instrument cluster and GND | Open or short circuit in wiring harness between instrument cluster and fuel gauge sender unit | Fuse malfunction (METER) | Open or short circuit in power supply (IG1) wiring harness | Open or short circuit in GND wiring harness DSC HU/CM | Poor connection of DSC HU/CM connector, terminal damage | DSC HU/CM | Short circuit in wiring harness between CAN-L, CAN-H and GND | Open circuit in CAN wiring harness (CAN-L, CAN-H) | CAN wiring harness (CAN-L, CAN-H) short each other | Poor connection of PCM connector, terminal damage | PCM | Poor connection of brake fluid level sensor connector, terminal damage | Brake fluid level sensor | Poor connection of Parking brake switch connector, terminal damage | Parking brake switch | Fuse malfunction (ROOM, ILLUMI) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Fuel gauge needle position incorrect | X | X | X | X | X | X | X | | | | | | | | | | | | | | | |
| 2 | All meters and gauges do not operate | | X | | X | | | | X | X | X | | | | | | | | | | | | |
| 3 | ABS warning light illuminates | | X | | X | | | | | | | X | X | X | X | X | | | | | | | |
| 4 | MIL illuminates | | X | | X | | | | | | | | | X | X | X | X | X | | | | | |
| 5 | Brake system warning light illuminates | | X | | X | | | | | | | X | X | X | X | X | | | X | X | X | X | |
| 6 | Instrument cluster illumination does not illuminate | | X | | X | | | | | | | | | | | | | | | | | | X |
| 7 | Speedometer indication is defective | | X | | X | | | | | | | X | X | X | X | X | X | X | | | | | |
| 8 | Tachometer indication is defective | | X | | X | | | | | | | | | X | X | X | X | X | | | | | |
| 9 | Water temperature gauge indication is defective | | X | | X | | | | | | | | | X | X | X | X | X | | | | | |

acxuuw00002089

## NO. 1 FUEL GAUGE NEEDLE POSITION INCORRECT[INSTRUMENT CLUSTER]

id0903d5807400

| 1 | Fuel gauge needle position incorrect |
|---|---|
| POSSIBLE CAUSE | • Fuel gauge sender unit malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Fuel gauge sender unit is improperly installed<br>• Open or short circuit in wiring harness between instrument cluster and GND<br>• Open or short circuit in wiring harness between instrument cluster and fuel gauge sender unit |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Verify that the fuel gauge needle does not move after ignition switch is turned off, or the display does not indicate F even though fuel tank is full.<br>• Is the fuel gauge normal? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs B1202 or B1204 been recorded in memory? | Yes | Perform the recorded DTC's troubleshooting.<br>(See 09-02E-1 DTC TABLE[INSTRUMENT CLUSTER].) |
| | | No | Go to the next step. |
| 3 | • Perform the check code 23 inspection.<br>• Is there any malfunction? | Yes | Replace the instrument cluster. |
| | | No | Go to the next step. |
| 4 | • Perform the check code 22 inspection.<br>• Is there any malfunction? | Yes | Go to the next step. |
| | | No | Go to Step 6. |
| 5 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Replace the instrument cluster. |
| | | No | Repair or replace the terminal. |
| 6 | • Turn the ignition switch off.<br>• Inspect the fuel gauge sender unit connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 7 | • Turn the ignition switch off.<br>• Is the fuel gauge sender unit installed properly? | Yes | Inspect the fuel gauge sender unit. |
| | | No | Reinstall the fuel gauge sender unit. |

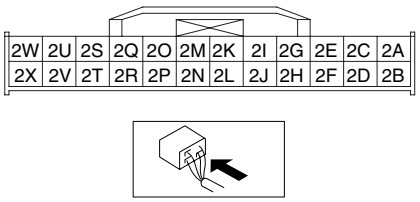
## NO. 2 ALL METERS AND GAUGES DO NOT OPERATE[INSTRUMENT CLUSTER]

id0903d5807500

| 2 | All meters and gauges do not operate |
|---|---|
| POSSIBLE CAUSE | • Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Fuse malfunction<br>• Open or short circuit in power supply (IG1) wiring harness<br>• Open or short circuit in GND wiring harness |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Inspect the following:<br>— Does the odometer/tripmeter illuminate?<br>— Does the fuel gauge operate?<br>— Does the MIL turn off within **approx. 3 s?** | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the METER fuse.<br>• Is the fuse normal? | Yes | Go to the next step. |
| | | No | Replace the fuse.<br>• If the fuse is melted, inspect the wiring harness for a short to ground. Repair or replace the wiring harness, then replace the fuse. |
| 3 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have any DTCs been recorded in memory? | Yes | Perform the recorded DTC's troubleshooting.<br>(See 09-02E-1 DTC TABLE[INSTRUMENT CLUSTER].) |
| | | No | Go to the next step. |

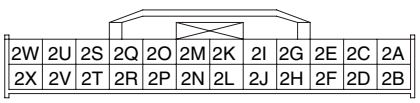
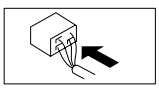
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | • Turn the ignition switch to LOCK position.<br>• Remove the instrument cluster.<br>• Disconnect the instrument cluster connector.<br>• Inspect the voltage between instrument cluster wiring harness-side connector terminal 2G and terminal 2C.<br>• Turn the ignition switch to the ON position.<br>• Is the voltage **B+?**<br>  <br><br> | Yes | Go to the next step. |
| | | No | Inspect the suspect wiring harness, then repair or replace. |
| 5 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Replace the instrument cluster. |
| | | No | Repair or replace the terminal. |

### NO. 3 ABS WARNING LIGHT ILLUMINATES[INSTRUMENT CLUSTER]

id0903d5807600

| 3 | ABS warning light illuminates |
|---|---|
| POSSIBLE CAUSE | • DSC HU/CM malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Short circuit in wiring harness between CAN-L, CAN-H and GND<br>• Open circuit in CAN wiring harness (CAN-L, CAN-H)<br>• CAN wiring harness (CAN-L, CAN-H) short each other |

**Diagnostic procedure**

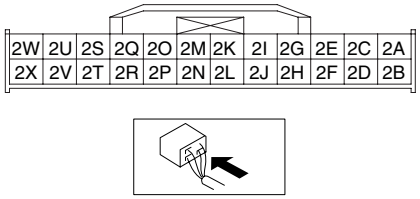
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Start the engine.<br>• Does the ABS warning light turn off? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Has DTC U2064 been recorded in memory? | Yes | Inspect the DTC for the DSC HU/CM.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 3 | • Disconnect the negative battery cable.<br>• Measure the resistance between the DLC-2 terminals F and E.<br>• Is the resistance **54— 66 ohms?** | Yes | Go to the next step. |
| | | No | Go to Step 5. |
| 4 | • Inspect the DLC-2 terminals F and E for short to power supply or GND.<br>• Is there any malfunction? | Yes | Inspect the wiring harness and CAN system-related module.<br>Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |
| 5 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 6 | • Disconnect the negative battery cable.<br>• Measure the resistance between the instrument cluster connector terminals 2R and 2T.<br>• Is the resistance **114— 126 ohms?**<br>  <br><br>  | Yes | Inspect the wiring harness and CAN system-related module.<br>Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |

## NO. 4 MIL ILLUMINATES[INSTRUMENT CLUSTER]

id0903d5807700

| 4 | MIL illuminates |
|---|---|
| POSSIBLE CAUSE | • PCM malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Short circuit in wiring harness between CAN-L, CAN-H and GND<br>• Open circuit in CAN wiring harness (CAN-L, CAN-H)<br>• CAN wiring harness (CAN-L, CAN-H) short each other |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Start the engine.<br>• Does the MIL turn off? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Have DTCs U2064 or U2023 been recorded in memory? | Yes | Inspect the DTC for the PCM.<br>(See 01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC].) |
| | | No | Go to the next step. |
| 3 | • Disconnect the negative battery cable.<br>• Measure the resistance between the DLC-2 terminals F and E.<br>• Is the resistance **54— 66 ohms?** | Yes | Go to the next step. |
| | | No | Go to Step 5. |
| 4 | • Inspect the DLC-2 terminals F and E for short to power supply or GND.<br>• Is there any malfunction? | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |
| 5 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 6 | • Disconnect the negative battery cable.<br>• Measure the resistance between the instrument cluster connector terminals 2R and 2T.<br>• Is the resistance **114— 126 ohms?**<br>  | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |

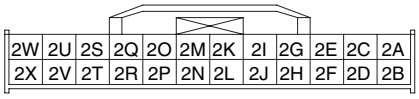
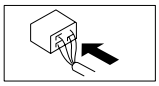
## NO. 5 BRAKE SYSTEM WARNING LIGHT ILLUMINATES[INSTRUMENT CLUSTER]

id0903d5807800

| 5 | Brake system warning light illuminates |
|---|---|
| POSSIBLE CAUSE | • DSC HU/CM malfunction<br>• Brake fluid level sensor malfunction<br>• Parking brake switch malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Short circuit in wiring harness between CAN-L, CAN-H and GND<br>• Open circuit in CAN wiring harness (CAN-L, CAN-H)<br>• CAN wiring harness (CAN-L, CAN-H) short each other |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Start the engine.<br>• Release the parking brake.<br>• Does the brake system warning light turn off? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Does the brake fluid need replenishment? | Yes | Add brake fluid. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Has DTC U2023 been recorded in memory? | Yes | Inspect the DTC for the DSC HU/CM.<br>(See 04-02-3 ON-BOARD DIAGNOSIS.) |
| | | No | Go to the next step. |
| 4 | • Inspect the brake fluid level sensor, parking brake switch or connectors.<br>• Is there any malfunction? | Yes | Repair or replace malfunctioning part. |
| | | No | Go to the next step. |
| 5 | • Disconnect the negative battery cable.<br>• Measure the resistance between the DLC-2 terminals F and E.<br>• Is the resistance **54— 66 ohms?** | Yes | Go to the next step. |
| | | No | Go to Step 7. |
| 6 | • Disconnect the negative battery cable.<br>• Inspect the DLC-2 terminals F and E for short to power supply or GND.<br>• Is there any malfunction? | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |
| 7 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 8 | • Disconnect the negative battery cable.<br>• Measure the resistance between the instrument cluster connector terminals 2R and 2T.<br>• Is the resistance **114— 126 ohms?**<br>  <br>  | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |

### NO. 6 INSTRUMENT CLUSTER ILLUMINATION DOES NOT ILLUMINATE[INSTRUMENT CLUSTER]

id0903d5807900

| 6 | **Instrument cluster illumination does not illuminate** |
|---|---|
| **POSSIBLE CAUSE** | • Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Fuse malfunction |

**Diagnostic procedure**

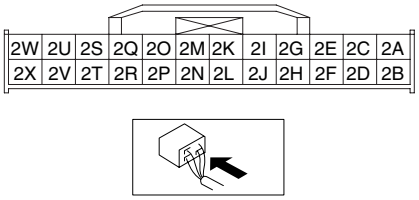
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the light switch to the TNS position.<br>• Does the instrument cluster illumination turn on? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Does the non-illumination include the entire instrument cluster? | Yes | Go to the next step. |
| | | No | Replace the instrument cluster. |
| 3 | • Inspect the ROOM and ILLUMI fuse.<br>• Are the fuses normal? | Yes | Go to the next step. |
| | | No | Replace the fuse.<br>• If the fuse is melted, inspect the wiring harness for short to ground. Repair or replace the wiring harness, then replace the fuse. |
| 4 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Replace the instrument cluster. |
| | | No | Repair or replace the terminal. |

## NO. 7 SPEEDOMETER INDICATION IS DEFECTIVE[INSTRUMENT CLUSTER]

id0903d5808000

| 7 | Speedometer indication is defective |
|---|---|
| POSSIBLE CAUSE | • DSC HU/CM malfunction<br>• PCM malfunction<br>• TCM malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Short circuit in wiring harness between CAN-L, CAN-H and GND<br>• Open circuit in CAN wiring harness (CAN-L, CAN-H)<br>• CAN wiring harness (CAN-L, CAN-H) short each other |

### Diagnostic procedure

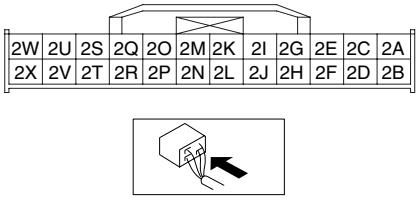
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Start the engine, and drive the vehicle.<br>— Does the speedometer needle move smoothly?<br>— Does the speedometer needle indicate correct speed? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Has DTC U2023 been recorded in memory? | Yes | Go to the next step. |
| | | No | Go to Step 4. |
| 3 | • Inspect the FREEZE FRAME DATA for DTC U2023.<br>• Has the speedometer fall-safe function been requested? | Yes | Inspect the DTC for the PCM, DTC HU/CM and TCM.<br>(See 01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC].)<br>(See 04-02-3 ON-BOARD DIAGNOSIS.)<br>(See 05-02-3 AUTOMATIC TRANSAXLE ON-BOARD DIAGNOSTIC FUNCTION[AW6A-EL, AW6AX-EL].) |
| | | No | Go to the next step. |
| 4 | • Start the instrument cluster input/output check mode.<br>• Inspect the speedometer using the check code 12.<br>• Is the speedometer normal? | Yes | Inspect the DSC HU/CM, or connectors. |
| | | No | Replace the instrument cluster. |
| 5 | • Disconnect the negative battery cable.<br>• Measure the resistance between the DLC-2 terminals F and E.<br>• Is the resistance **54— 66 ohms?** | Yes | Go to the next step. |
| | | No | Go to Step 7. |
| 6 | • Disconnect the negative battery cable.<br>• Inspect the DLC-2 terminals F and E for short to power supply or GND.<br>• Is there any malfunction? | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |
| 7 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 8 | • Disconnect the negative battery cable.<br>• Measure the resistance between the instrument cluster connector terminals 2R and 2T.<br>• Is the resistance **114— 126 ohms?**<br>  | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |

## NO. 8 TACHOMETER INDICATION IS DEFECTIVE[INSTRUMENT CLUSTER]

id0903d5808100

| 8 | Tachometer indication is defective |
|---|---|
| POSSIBLE CAUSE | • PCM malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Short circuit in wiring harness between CAN-L, CAN-H and GND<br>• Open circuit in CAN wiring harness (CAN-L, CAN-H)<br>• CAN wiring harness (CAN-L, CAN-H) short each other |

**Diagnostic procedure**

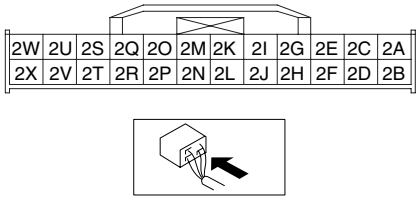
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Start the engine.<br>— Does the tachometer needle move smoothly?<br>— Does the tachometer needle indicate correct engine speed? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Has DTC U2023 been recorded in memory? | Yes | Go to the next step. |
| | | No | Go to Step 4. |
| 3 | • Inspect the FREEZE FRAME DATA for DTC U2023.<br>• Has the speedometer fall-safe function been requested? | Yes | Inspect the DTC for the PCM.<br>(See 01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | • Start the instrument cluster input/output check mode.<br>• Inspect the tachometer using the check code 13.<br>• Is the tachometer normal? | Yes | Inspect the PCM or connectors. |
| | | No | Replace the instrument cluster. |
| 5 | • Disconnect the negative battery cable.<br>• Measure the resistance between the DLC-2 terminals F and E.<br>• Is the resistance **54— 66 ohms?** | Yes | Go to the next step. |
| | | No | Go to Step 7. |
| 6 | • Disconnect the negative battery cable.<br>• Inspect the DLC-2 terminals F and E for short to power supply or GND.<br>• Is there any malfunction? | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |
| 7 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 8 | • Disconnect the negative battery cable.<br>• Measure the resistance between the instrument cluster connector terminals 2R and 2T.<br>• Is the resistance **114— 126 ohms?**<br>  <br> | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |

## NO. 9 WATER TEMPERATURE GAUGE INDICATION IS DEFECTIVE[INSTRUMENT CLUSTER]

id0903d5808200

| 9 | Water temperature gauge indication is defective |
|---|---|
| POSSIBLE CAUSE | • PCM malfunction<br>• Instrument cluster malfunction<br>• Connector or pin malfunction<br>• Short circuit in wiring harness between CAN-L, CAN-H and GND<br>• Open circuit in CAN wiring harness (CAN-L, CAN-H)<br>• CAN wiring harness (CAN-L, CAN-H) short each other |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Start the engine.<br>• Does the water temperature gauge needle move to medium range gradually and stay there? | Yes | Troubleshooting completed. |
| | | No | Go to the next step. |
| 2 | • Inspect the DTC for the instrument cluster ON-BOARD DIAGNOSTIC SYSTEM.<br>• Has DTC U2023 been recorded in memory? | Yes | Go to the next step. |
| | | No | Go to Step 4. |
| 3 | • Inspect the FREEZE FRAME DATA for DTC U2023.<br>• Has the speedometer fall-safe function been requested? | Yes | Inspect the DTC for the PCM.<br>(See 01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC].) |
| | | No | Go to the next step. |
| 4 | • Start the instrument cluster input/output check mode.<br>• Inspect the water temperature gauge using the check code 25.<br>• Is the water temperature gauge normal? | Yes | Inspect the PCM or connectors. |
| | | No | Go to the next step. |
| 5 | • Disconnect the negative battery cable.<br>• Measure the resistance between the DLC-2 terminals F and E.<br>• Is the resistance **54— 66 ohms?** | Yes | Go to the next step. |
| | | No | Go to Step 7. |
| 6 | • Disconnect the negative battery cable.<br>• Inspect the DLC-2 terminals F and E for short to power supply or GND.<br>• Is there any malfunction? | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |
| 7 | • Turn the ignition switch off.<br>• Inspect the instrument cluster connector terminals for poor connection (such as damaged/pulled-out pins, and corrosion).<br>• Are the terminals normal? | Yes | Go to the next step. |
| | | No | Repair or replace the terminal. |
| 8 | • Disconnect the negative battery cable.<br>• Measure the resistance between the instrument cluster connector terminals 2R and 2T.<br>• Is the resistance **114— 126 ohms?**<br>  | Yes | Inspect the wiring harness and CAN system-related module. Repair or replace the malfunctioning part. |
| | | No | Replace the instrument cluster. |

# 09-03D SYMPTOM TROUBLESHOOTING [ENTIRE AUDIO SYSTEM]

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**NO.9 AUDIO SYSTEM ILLUMINATION DOES NOT ILLUMINATE AT ALL [ENTIRE AUDIO SYSTEM] . . . . . 09-03D–17**
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## FOREWORD[ENTIRE AUDIO SYSTEM]

id0903e2802700

**Note**
- Record all radio programs set by customer prior to the repairs. Set all radio programs and adjust the time after repairs.

### Troubleshooting Index

| No. | Symptom | Possible DTC |
|---|---|---|
| 1 | AF noise or POP noise on all sources (Radio, CD, Cassette tape) | 09:Er20, 09:Er21 |
| 2 | No power on the entire audio system | 09:Er20 |
| 3 | No sound at all | 00:Er04, 00:Er10, 03:Er07, 03:Er10, 09:Er20, 09:Er21 |
| 4 | No sound from some speaker | — |
| 5 | Broken sound or poor sound quality | 09:Er21 |
| 6 | Sound becomes loudly or weakly while driving the vehicle | — |
| 7 | ALC function is inoperative (without Bose) | 16:Er12 |
| 8 | Audio pilot function is inoperative (with Bose) | 16:Er12 |
| 9 | Audio system illumination does not illuminate at all. | 09:Er20, 21:Er19 |
| 10 | LCD does not display at all. | 09:Er20, 21:Er19 |

## Quick Diagnostic Chart (Entire Audio System)

X: Applicable

| Possible factor \ Troubleshooting item | 1 AF noise or POP noise on all sources (Radio, CD, Cassette tape) | 2 No power on the entire audio system | 3 No sound at all | 4 No sound from some speakers | 5 Broken sound or poor sound quality | 6 Sound becomes loud or weak while driving the vehicle | 7 ALC function is inoperative (without Bose) | 8 Audio pilot function is inoperative (with Bose) | 9 Audio system illumination does not illuminate at all. | 10 LCD does not display at all. |
|---|---|---|---|---|---|---|---|---|---|---|
| Low vehicle battery voltage | X | | | | | | | | | |
| Jammed radio signals from after market equipment | X | | | | | | | | | |
| Speaker malfunction (e. g., any foreign material, broken) | X | | X | X | X | | | | | |
| Improper speaker installation | X | | | | X | | | | | |
| Poor connection of audio unit connector, terminal damage | X | X | | X | | | | | X | |
| Antenna malfunction (e.g., poor ground) | X | | | | | | | | | |
| Audio unit malfunction | | X | X | X | X | X | X | X | X | X |
| Audio amplifier malfunction (with Bose) | X | | X | X | X | X | | X | | |
| Burnt fuse (B+) | | X | | | | | | | | |
| Burnt fuse (ACC) | | X | | | | | | | | |
| Open or short circuit in power supply (B+) wiring harness | | X | | | | | | | | |
| Open or short circuit in power supply (ACC) wiring harness | | X | | | | | | | | |
| Short circuit in wiring harness between audio unit and speaker (without Bose) | | | X | X | | | | | | |
| Open circuit in wiring harness between audio unit and speaker (without Bose) | | | | X | | | | | | |
| Open or short circuit in wiring harness between audio amplifier and ground (with Bose) | X | | | | | | | | | |
| Open or short circuit in wiring harness between audio amplifier and speaker (with Bose) | | | X | X | | | | | | |
| Open or short circuit in wiring harness between audio amplifier and audio unit (with Bose) | | | X | X | | | | | | |
| Poor connection of audio amplifier connector, terminal damage (with Bose) | X | | X | X | | | | X | | |
| Short circuit inside speaker | | | X | X | | | | | | |
| Vibration of door trim and/or package trim | | | | | X | | | | | |
| CAN signal wiring harness malfunction | | | | | | | X | | | |
| Open or short circuit in vehicle speed signal wiring harness (e.g., instrument cluster) | | | | | | | X | | | |
| Burnt fuse (TNS signal) | | | | | | | | | X | |
| Open or short circuit in TNS signal wiring harness | | | | | | | | | X | |
| Center panel malfunction | | | | | | | | | X | |
| Information display malfunction | | | | | | | | | | X |
| Open or short circuit in Mic unit signal wiring harness | | | | | | | | X | | |
| Open or short circuit in Audio Pilot signal wiring harness | | | | | | | | X | | |

acxuuw00001154

### CONFIRMATION STEP 1: AUDIO PANEL SWITCH CONFIRMATION[ENTIRE AUDIO SYSTEM]

id0903e2802800

- Verify the customer complaint and identify either the center panel malfunction or audio unit malfunction.

**How to activate audio panel switch confirmation mode**

1. Turn the audio system to ON.
2. Press both POWER SW and MEDIA buttons for a second at the same time.
3. The audio panel switch confirmation mode is now activated.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Press each button on the center panel.<br>• Does buzzer sound when pressing each button? | Yes | Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure. |
| | | No | Go to the next step. |
| 2 | • Disassemble and reassemble the center panel and audio unit.<br>• Activate the audio panel switch confirmation mode.<br>• Does buzzer sound when pressing each button? | Yes | Go to the next step. |
| | | No | Replace the center panel. |
| 3 | • Does the audio system operate properly? | Yes | The system is normal. |
| | | No | Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure. |

### CONFIRMATION STEP 2: AUDIO CONTROL SWITCH CONFIRMATION[ENTIRE AUDIO SYSTEM]

id0903e2802900

- Verify the customer complaint and identify either the audio control switch malfunction or audio unit malfunction.

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is the symptom related to either the audio control switch or audio panel operation? | Yes | Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure. |
| | | No | **The symptom is related to the audio panel operation:**<br>• Follow the “Confirmation Step 1”.<br>**The symptom is related to the audio control switch operation:**<br>• Go to the next step. |
| 2 | • Disconnect the audio unit connector (24-pin).<br>• Inspect both the audio unit and wiring harness-side connectors for poor connection. (such as damaged/pulled-out pins, corrosion).<br>— Terminal N (ST SW1)<br>— Terminal P (ST SW2)<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the audio unit side connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 3 | • Inspect the continuity between the audio unit wiring harness-side connector terminal N and P while operating the audio control switch.<br>• Does the resistance change? | Yes | Verify the customer complaint and then go to the appropriate symptom troubleshooting procedure. |
| | | No | Go to the next step. |
| 4 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio control switch.<br>• Inspect the continuity between the audio unit wiring harness-side connector (24-pin) terminal and the audio control switch wiring harness-side connector (8-pin) terminal.<br>— Terminal N (24-pin) — Terminal G (8-pin)<br>— Terminal P (24-pin) — Terminal H (8-pin)<br>• Is there the continuity? | Yes | Replace the audio control switch. |
| | | No | Repair or replace the suspect wiring harness. |

## NO.1 AF NOISE OR POP NOISE ON ALL SOURCES (RADIO, CD, CASSETTE TAPE)[ENTIRE AUDIO SYSTEM]

id0903e2803000

| 1 | AF noise or POP noise on all sources (Radio, CD, Cassette tape)/Possible DTC: 09:Er20, 09:Er21 |
|---|---|

**Troubleshooting hints**

- Low vehicle battery voltage.
- Jammed radio signals from after market equipment.
- Speaker malfunction (e.g., any foreign material, broken)
- Improper speaker installation
- Audio unit malfunction
- Poor connection of audio unit connector, terminal damage
- Poor connection of audio amplifier connector, terminal damage (with Bose)
- Antenna malfunction (e.g., poor ground)

**Note**

- AF noise is a snapping noise that generally occurs during ON/OFF switching operations of electrical equipment other than the audio unit, or a continual rasping noise that occurs when electrical equipment is operated. This is caused by noise interference in the power supply wiring, signal wiring, speaker cable or head of cassette deck. Therefore noise can be heard regardless of radio wave conditions or the audio volume position. The noise will start after one click from the minimum position of the volume button but normally does not change even when volume is turned to a higher position.
- POP noise is snapping or popping noise that occurs during ON/OFF switching operation of the audio unit, or when switching from radio to CD. Even a normal audio unit sometimes emits a little noise depending on the conditions.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the vehicle battery voltage.<br>• Is the vehicle battery voltage normal?<br>**Specification:**<br>**Ignition switch ON: 11.5 V or more**<br>**Idle: 12.5 V or more** | Yes | Go to the next step. |
| | | No | Charge the battery, then go to the next step. |
| 2 | • Turn the audio system to ON.<br>• Is there any noise? | Yes | Go to the next step. |
| | | No | The system is normal. Explain to the customer that the vehicle battery voltage was low. |
| 3 | • Is any of the following after-market equipment installed? (Inspect especially near the antenna.)<br>— Radar<br>— Remote engine starter<br>— Anti-theft device<br>— Other | Yes | Go to the next step. |
| | | No | Go to the Step 5. |
| 4 | • Remove the after-market equipment.<br>• Turn the audio system to ON.<br>• Is there any noise? | Yes | Go to the next step. |
| | | No | The system is normal. The after-market electrical devices might make a noise. |
| 5 | • Is there the noise from all speakers? | Yes | Go to the Step 7. |
| | | No | Go to the next step. |
| 6 | • Inspect the suspect speaker.<br>• Is the speaker normal? | Yes | Go to the next step. |
| | | No | **If there is any foreign material on the speaker:**<br>• Remove the foreign material from the speaker.<br>**If the speaker is malfunctioning:**<br>• Replace the speaker.<br>**If the speaker is not installed properly:**<br>• Install the speaker properly. |
| 7 | • Attempt to duplicate the symptom on the other vehicle.<br>• Is the noise better than the customer's vehicle? | Yes | Go to the next step. |
| | | No | The system is normal. Explain the noise generation mechanism to the customer.<br>**Note**<br>• The noise may be heard depends on the operating speed of audio power and/or mode switch. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Inspect the connection of the audio unit connector (24-pin) (for sound signal line).<br>• Is the connector connected securely? | Yes | Go to the next step. |
| | | No | **If poor connection of audio unit connector:**<br>• Securely connect the audio unit connector.<br>**If the audio unit side connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector.<br>After treating either the above-mentioned, then go to the next step. |
| 9 | • Is there any noise? | Yes | Go to the next step. |
| | | No | The system is normal. |
| 10 | • Inspect the ground condition of the antenna.<br>• Is the ground condition normal? | Yes | Go to the next step. |
| | | No | Repair or replace the ground. Go to the next step. |
| 11 | • Is there any noise? | Yes | **Without Bose:**<br>Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ASSEMBLY.)<br>**With Bose:**<br>• If noise occurs from the speaker of a specific channel, or the volume is minimized and the noise occurs:<br>— Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/INSTALLATION.)<br>• If noise occurs from the speaker of two or more channels or the volume is minimized and the noise dose not occurs:<br>— Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ASSEMBLY.) |
| | | No | The system is normal. |



### NO.2 NO POWER ON THE ENTIRE AUDIO SYSTEM[ENTIRE AUDIO SYSTEM]

id0903e2803100

| 2 | No power on the entire audio system/Possible DTC: 09:Er20 |
|---|---|

**Troubleshooting hints**

- Poor connection of audio unit connector, terminal damage
- Audio unit malfunction
- Burnt fuse (B+)
- Burnt fuse (ACC)
- Open or short circuit in power supply (B+) wiring harness
- Open or short circuit in power supply (ACC) wiring harness

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the LOCK position.<br>• Inspect the following fuses:<br>— RADIO<br>— ROOM<br>• Are the fuse normal? | Yes | Go to the next step. |
| | | No | Replace with the appropriate standard fuse.<br>• If the fuse is melted, inspect the wiring harness for short to ground. Repair or replace the wiring harness, then replace the fuse. |
| 2 | • Remove the audio unit.<br>• Inspect the connection of the audio unit connector (24-pin).<br>• Disconnect the audio unit connector and inspect both the audio unit and wiring harness-side connectors for poor connection. (such as damaged/pulled-out pins, corrosion).<br>— Terminal B (B+)<br>— Terminal R (ACC)<br>— Terminal W (GND)<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If poor connection of audio unit connector:**<br>• Securely connect the audio unit connector.<br>**If the audio unit side connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | • Connect the audio unit connector.<br>• Inspect the voltage for the power supply line (B+, ACC).<br>**Specification:**<br>**Ignition switch ON: 11.5 V or more**<br>**Idle: 12.5 V or more**<br>• Is the voltage normal? | Yes | Go to the next step. |
| | | No | Repair or replace the suspect wiring harness. |
| 4 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit connector (24-pin).<br>• Inspect the continuity between the audio unit wiring harness-side connector terminal W and the ground.<br>• Is there the continuity? | Yes | Replace the audio unit. |
| | | No | Repair or replace the wiring harness. |

### NO.3 NO SOUND FROM ALL SPEAKERS[ENTIRE AUDIO SYSTEM]

id0903e2803200

**Vehicles Without Bose**

| 3 | No sound from all speakers/Possible DTC: 00:Er04, 00:Er10, 03:Er07, 03:Er10, 09:Er20, 09:Er21 |
|---|---|

**Troubleshooting hints**

- Speaker malfunction (e.g., any foreign material, broken)
- Audio unit malfunction
- Short circuit in wiring harness between audio unit and speaker
- Short circuit inside speaker

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Press AUDIO CONT button **more than 2 second**.<br>• Play the CD or Radio.<br>• Adjust the volume between ”10” to “15”.<br>• Is there sound? | Yes | The system is normal. |
| | | No | Go to the next step. |
| 2 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Disconnect the audio connector (24-pin).<br>• Inspect the continuity between the audio unit wiring harness-side connector terminal and ground:<br>**For front door speaker**<br>— Terminal A (L+) — GND<br>— Terminal C (L-) — GND<br>— Terminal D (R+) — GND<br>— Terminal F (R-) — GND<br>**For rear door speaker**<br>— Terminal S (L+) — GND<br>— Terminal U (L-) — GND<br>— Terminal V (R+) — GND<br>— Terminal X (R-) — GND<br>— Is there continuity? | Yes | Repair or replace the suspect wiring harness or speaker unit.<br>**Note**<br>• If there is a short circuit between the speaker harness or speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound. |
| | | No | Go to the next step. |
| 3 | • Remove the speaker.<br>• Disconnect the speaker connector (2-pin).<br>• Inspect the continuity between the speaker wiring harness-side connector (2-pin) terminal and ground:<br>**For each speaker**<br>— Terminal A — GND<br>— Terminal B — GND<br>• Is there continuity? | Yes | Replace the speaker. |
| | | No | Replace the audio unit. |

**Vehicles With Bose**

| 3 | No sound from all speakers/Possible DTC: 00:Er04, 03:Er07, 03:Er10, 09:Er20, 09:Er21 |
|---|---|

**Troubleshooting hints**

- Speaker malfunction (e.g., any foreign material, broken)
- Audio amplifier malfunction
- Open or short circuit in wiring harness between audio amplifier and speaker
- Open or short circuit in wiring harness between audio amplifier and audio unit
- Short circuit inside speaker

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Press AUDIO CONT button **more than 2 seconds**.<br>• Play CD or radio.<br>• Adjust the volume between “10” and “15”.<br>• Is there sound? | Yes | The system is normal. |
| | | No | Go to the next step. |
| 2 | • Measure the voltage at the audio amplifier terminal A (8-pin, vehicle harness-side)<br>• Is the voltage **B+**? | Yes | Go to Step 4. |
| | | No | Repair or replace wiring harness between the audio amplifier and fuse.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)<br>Go to the next step. |
| 3 | • Is there any sound? | Yes | The system is normal. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | • Turn the ignition switch to the LOCK position.<br>• Disconnect the audio amplifier connector (40-pin).<br>• Inspect continuity between the following terminals of the audio amplifier connector and speaker connector.<br>**For front speaker (LH)**<br>— Terminal 2A (40-pin)— Terminal A (speaker)<br>— Terminal 2B (40-pin)— Terminal B (speaker)<br>**For front speaker (RH)**<br>— Terminal 2F (40-pin)— Terminal A (speaker)<br>— Terminal 2D (40-pin)— Terminal B (speaker)<br>**For front door speaker (LH)**<br>— Terminal 2N (40-pin)— Terminal A (speaker)<br>— Terminal 2I (40-pin)— Terminal B (speaker)<br>**For front door speaker (RH)**<br>— Terminal 2M (40-pin)— Terminal A (speaker)<br>— Terminal 2R (40-pin)— Terminal B (speaker)<br>**For rear door speaker (LH)**<br>— Terminal 2G (40-pin)— Terminal A (speaker)<br>— Terminal 2I (40-pin)— Terminal B (speaker)<br>**For rear door speaker (RH)**<br>— Terminal 2E (40-pin)— Terminal A (speaker)<br>— Terminal 2C (40-pin)— Terminal B (speaker)<br>**For rear speaker (LH)**<br>— Terminal 2J (40-pin)— Terminal A (speaker)<br>— Terminal 2H (40-pin)— Terminal B (speaker)<br>**For rear speaker (RH)**<br>— Terminal 1F (40-pin)— Terminal A (speaker)<br>— Terminal 1H (40-pin)— Terminal B (speaker)<br>**For center speaker**<br>— Terminal 1E (40-pin)— Terminal A (speaker)<br>— Terminal 1G (40-pin)— Terminal B (speaker)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the repair related wiring harnesses. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | • Turn the ignition switch to LOCK position.<br>• Disconnect the audio amplifier connector (40-pin).<br>• Inspect the continuity between the audio amplifier connector and ground:<br>**For front speaker**<br>— Terminal 2A (40-pin, FRONT IP L SP-)— GND<br>— Terminal 2B (40-pin, FRONT IP L SP+)— GND<br>— Terminal 2F (40-pin, FRONT IP R SP-)— GND<br>— Terminal 2D (40-pin, FRONT IP R SP+)— GND<br>**For front door speaker**<br>— Terminal 2N (40-pin, FRONT DOOR L SP-)— GND<br>— Terminal 2I (40-pin, FRONT DOOR L SP+)— GND<br>— Terminal 2M (40-pin, FRONT DOOR R SP-)— GND<br>— Terminal 2R (40-pin, FRONT DOOR R SP-)— GND<br>**For rear door speaker**<br>— Terminal 2G (40-pin, REAR DOOR L SP-)— GND<br>— Terminal 2I (40-pin, REAR DOOR L SP+)— GND<br>— Terminal 2E (40-pin, REAR DOOR R SP-)— GND<br>— Terminal 2C (40-pin, REAR DOOR R SP+)— GND<br>**For rear speaker**<br>— Terminal 2J (40-pin, D-PILLAR L SP-)— GND<br>— Terminal 2H (40-pin, D-PILLAR L SP+)— GND<br>— Terminal 1F (40-pin, D-PILLAR R SP-)— GND<br>— Terminal 1H (40-pin, D-PILLAR R SP+)— GND<br>**For center speaker**<br>— Terminal 1E (40-pin, DASH CENTER -)— GND<br>— Terminal 1G (40-pin, DASH CENTER +)— GND<br>• Is there continuity? | Yes | Repair or replace the related wiring harness or speaker unit.<br>**Note**<br>• If there is a short circuit between the speaker harness or speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound. |
| | | No | Go to the next step. |
| 6 | • Turn the ignition switch to LOCK position.<br>• Disconnect the audio amplifier connector (40-pin) and audio unit connector (24-pin).<br>• Inspect the continuity between the audio amplifier terminal 3N (40-pin, vehicle harness-side) and audio unit terminal J (24-pin, vehicle harness- side).<br>• Is there continuity? | Yes | Replace the audio amplifier. |
| | | No | Repair or replace the wiring harness between the audio amplifier and audio unit.<br>Then go to the next step. |
| 7 | • Is there any sound? | Yes | The system is normal |
| | | No | Replace the audio amplifier. |

## NO.4 NO SOUND FROM CERTAIN SPEAKER[ENTIRE AUDIO SYSTEM]

id0903e2803300

### Vehicles Without Bose

| 4 | No sound from certain speaker/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Speaker malfunction (e.g., any foreign material, broken)
- Audio unit malfunction
- Short circuit inside speaker
- Open or short circuit in wiring harness between audio unit and speaker

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the audio unit to ON.<br>• Press both POWER and AUTO-M buttons more than **0.2 seconds** at the same time.<br><br>**Note**<br>• The sounded speaker now changes in the order of left — front speaker, right — front speaker, right — rear speaker and left — rear speaker.<br><br>• Is there any speaker with no sound? | Yes | **If no sound from some speaker:**<br>• Go to the next step.<br>**If no sound at all:**<br>• Go to the troubleshooting of “No.3 No sound from all speakers”. |
| | | No | The troubleshooting is completed. |
| 2 | • Turn the ignition switch to the LOCK position.<br>• Disconnect the audio unit connector (24-pin).<br>• Inspect the continuity between the audio unit wiring harness-side connector (24-pin) terminal and ground.<br>• Is there continuity? | Yes | Repair or replace the suspect wiring harness or speaker unit.<br><br>**Note**<br>• If there is a short circuit between the speaker harness or speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound. |
| | | No | Go to the next step. |
| 3 | • Remove the suspect speaker.<br>• Disconnect the speaker connector (2-pin) and inspect the resistance of speaker.<br>• Is the resistance normal?<br>**Specification**<br>**Speaker resistance + wiring harness resistance** | Yes | Replace the audio unit. |
| | | No | Go to the next step. |
| 4 | • Inspect the wiring harness between the audio unit and the suspect speaker.<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the suspect wiring harness. |
| 5 | • Inspect the suspect speaker.<br>• Is the speaker normal?<br><br>**Note**<br>• If the speaker lead wire contacts to either ground or vehicle frame, replace the speaker. | Yes | Replace the audio unit. |
| | | No | Go to the next step. |

**Vehicles With Bose**

| 4 | No sound from certain speaker/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Speaker malfunction (e.g., foreign material, broken)
- Audio amplifier malfunction
- Short circuit inside speaker
- Open or short circuit in wiring harness between audio amplifier and speaker
- Open or short circuit in wiring harness between audio amplifier and audio unit
- Poor connection of audio unit connector, terminal damage
- Poor connection of audio amplifier connector

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the audio unit on.<br>• Press the POWER button and simultaneously press down the AUTO-M switch for **0.2 seconds**.<br><br>**Note**<br>• This function outputs sound to each speaker sequentially to allow determination of which speaker is not emitting sound.<br><br>• Is there any speaker with no sound? | Yes | **If no sound from some speaker:**<br>• Go to the next step.<br>**If not sound at all:**<br>• Go to the troubleshooting of “No.3 No sound from all speakers”. |
| | | No | The troubleshooting completed. (The system is normal.) |
| 2 | • Does the same speaker have no sound if changing the sound source? (Radio, CD) | Yes | Go to the next step. |
| | | No | Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ASSEMBLY.)<br><br>**Note**<br>• If the different speaker has no sound now, the audio unit is malfunctioning. |
| 3 | • Turn the ignition switch to the LOCK position.<br>• Inspect the connection of the audio unit connector (24-pin). (for sound signal line)<br>• Is the connector connected securely? | Yes | Go to the next step. |
| | | No | Connect the audio unit connector (24-pin) securely. |
| 4 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Disconnect the audio unit connector (24-pin).<br>• Inspect the continuity between the audio unit wiring harness-side connector and ground.<br>— Terminal A (LH+)— GND<br>— Terminal C (LH-)— GND<br>— Terminal D (RH+)— GND<br>— Terminal F (RH-)— GND<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Go to Step 6. |
| 5 | • Inspect the continuity between the following terminals of the audio amplifier wiring harness-side connector (40-pin) and the audio unit wiring harness-side connector (24-pin).<br>**For front speaker (audio unit— audio amplifier)**<br>— Terminal A (LH+)— Terminal 3L<br>— Terminal C (LH-)— Terminal 3J<br>— Terminal D (RH+)— Terminal K<br>— Terminal F (RH-)— Terminal I<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the related wiring harness between the audio amplifier and the audio unit.<br>Then go to the next step. |
| 6 | • Inspect the connection of the audio amplifier connector (40-pin).<br>• Is the connector connected securely? | Yes | Go to the next step. |
| | | No | Connect the audio amplifier (40-pin) securely. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | • Turn the ignition switch to the LOCK position.<br>• Disconnect the audio amplifier connector (40-pin).<br>• Inspect continuity between the following terminals of the audio amplifier connector and speaker connector.<br>**For front speaker (LH)**<br>— Terminal 2A (40-pin)— Terminal A (speaker)<br>— Terminal 2B (40-pin)— Terminal B (speaker)<br>**For front speaker (RH)**<br>— Terminal 2F (40-pin)— Terminal A (speaker)<br>— Terminal 2D (40-pin)— Terminal B (speaker)<br>**For front door speaker (LH)**<br>— Terminal 2N (40-pin)— Terminal A (speaker)<br>— Terminal 2I (40-pin)— Terminal B (speaker)<br>**For front door speaker (RH)**<br>— Terminal 2M (40-pin)— Terminal A (speaker)<br>— Terminal 2R (40-pin)— Terminal B (speaker)<br>**For rear door speaker (LH)**<br>— Terminal 2G (40-pin)— Terminal A (speaker)<br>— Terminal 2I (40-pin)— Terminal B (speaker)<br>**For rear door speaker (RH)**<br>— Terminal 2E (40-pin)— Terminal A (speaker)<br>— Terminal 2C (40-pin)— Terminal B (speaker)<br>**For rear speaker (LH)**<br>— Terminal 2J (40-pin)— Terminal A (speaker)<br>— Terminal 2H (40-pin)— Terminal B (speaker)<br>**For rear speaker (RH)**<br>— Terminal 1F (40-pin)— Terminal A (speaker)<br>— Terminal 1H (40-pin)— Terminal B (speaker)<br>**For center speaker**<br>— Terminal 1E (40-pin)— Terminal A (speaker)<br>— Terminal 1G (40-pin)— Terminal B (speaker)<br>• Is there continuity? | Yes | Go to the next step. |
| | | No | Repair or replace the repair related wiring harnesses. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | • Turn the ignition switch to LOCK position.<br>• Disconnect the audio amplifier connector (40-pin).<br>• Inspect the continuity between the audio amplifier connector and ground:<br>**For front speaker**<br>— Terminal 2A (40-pin, FRONT IP L SP-)— GND<br>— Terminal 2B (40-pin, FRONT IP L SP+)— GND<br>— Terminal 2F (40-pin, FRONT IP R SP-)— GND<br>— Terminal 2D (40-pin, FRONT IP R SP+)— GND<br>**For front door speaker**<br>— Terminal 2N (40-pin, FRONT DOOR L SP-)— GND<br>— Terminal 2I (40-pin, FRONT DOOR L SP+)— GND<br>— Terminal 2M (40-pin, FRONT DOOR R SP-)— GND<br>— Terminal 2R (40-pin, FRONT DOOR R SP-)— GND<br>**For rear door speaker**<br>— Terminal 2G (40-pin, REAR DOOR L SP-)— GND<br>— Terminal 2I (40-pin, REAR DOOR L SP+)— GND<br>— Terminal 2E (40-pin, REAR DOOR R SP-)— GND<br>— Terminal 2C (40-pin, REAR DOOR R SP+)— GND<br>**For rear speaker**<br>— Terminal 2J (40-pin, D-PILLAR L SP-)— GND<br>— Terminal 2H (40-pin, D-PILLAR L SP+)— GND<br>— Terminal 1F (40-pin, D-PILLAR R SP-)— GND<br>— Terminal 1H (40-pin, D-PILLAR R SP+)— GND<br>**For center speaker**<br>— Terminal 1E (40-pin, DASH CENTER -)— GND<br>— Terminal 1G (40-pin, DASH CENTER +)— GND<br>• Is there continuity? | Yes | Repair or replace the related wiring harness or speaker unit.<br>(See 09-20-6 FRONT DOOR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-9 CENTER SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 FRONT SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.)<br><br>**Note**<br>• If there is a short circuit between the speaker harness or speaker lead wire and ground, the protector circuit inside the audio unit operates to cut the sound. |
| | | No | Go to the next step. |
| 9 | • Remove the suspect speaker.<br>• Disconnect the speaker connector (2-pin) and inspect the resistance of speaker.<br>**Specification:**<br>**Speaker resistance + wiring resistance**<br><br>**Note**<br>• If the speaker lead wire contacts to either ground or vehicle frame, replace the speaker. | Yes | Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) |
| | | No | Replace the speaker.<br>(See 09-20-6 FRONT DOOR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-9 CENTER SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 FRONT SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.) |

## NO.5 BROKEN SOUND OR POOR SOUND QUALITY[ENTIRE AUDIO SYSTEM]

id0903e2803400

| 5 | Broken sound or poor sound quality/Possible DTC: 09:Er21 |
|---|---|

**Troubleshooting hints**

- Speaker malfunction (e.g., any foreign material, broken)
- Improper speaker installation
- Audio unit malfunction
- Vibration of door trim and/or package trim

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is there broken sound or poor sound quality from all speakers? | Yes | Go to the next step. |
| | | No | Go to the Step 5. |
| 2 | • Inspect the sound while adjusting the sound volume.<br>• Is there broken sound or poor sound quality between “15” and “20”? | Yes | Go to the next step. |
| | | No | The system is normal. |
| 3 | • Inspect the BASS/TREB.<br>• Is there poor sound quality at “-3 — +3” of “BASS/TREB”?<br><br>**Note**<br>• When press the AUDIO CONT button for a few seconds, BASS/TREB is set at “0”. | Yes | Go to the next step. |
| | | No | If there is broken sound at “+6— -6” of BASS/TREB with the maximum volume, the system is normal. |
| 4 | • Attempt to duplicate the symptom on the other vehicle.<br>• Is the sound better than the customer’s vehicle? | Yes | **Without Bose:**<br>Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ ASSEMBLY.)<br>**With Bose:**<br>• If noise occurs from the speaker of a specific channel, or the volume is minimized and the noise occurs:<br>— Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)<br>• If noise occurs from the speaker of two or more channels or the volume is minimized and the noise does not occurs:<br>— Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/ INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ ASSEMBLY.) |
| | | No | The system is normal. |
| 5 | • Identify the speaker with broken sound by adjusting BAL/FADE.<br>• Is the suspect speaker installed upward? | Yes | Go to the Step 7. |
| | | No | Go to the next step. |
| 6 | • Inspect the speaker installation condition.<br>• Is the speaker installed properly? | Yes | Go to the next step. |
| | | No | Install the speaker properly. |
| 7 | • Remove the speaker.<br>• Is there any foreign material or damage on the speaker? | Yes | Repair or replace the suspect speaker. |
| | | No | Go to the next step. |
| 8 | • Inspect the sound again.<br>• Is there broken sound? | Yes | Go to the next step. |
| | | No | Inspect the vibration from the door trim and/or package trim. Repair or replace the suspect trim as necessary. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | • Replace with the speaker known to be good. (e.g., swap right and left speakers)<br>• Does the broken sound appear at the same location? | Yes | **Without Bose:**<br>Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ ASSEMBLY.)<br>**With Bose:**<br>• If noise occurs from the speaker of a specific channel, or the volume is minimized and the noise occurs:<br>— Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.)<br>• If noise occurs from the speaker of two or more channels or the volume is minimized and the noise dose not occurs:<br>— Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/ INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ ASSEMBLY.) |
| | | No | Replace the speaker.<br>(See 09-20-6 FRONT DOOR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-9 CENTER SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 FRONT SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.) |



### NO.6 SOUND BECOMES LOUD OR WEAK WHILE DRIVING THE VEHICLE[ENTIRE AUDIO SYSTEM]

id0903e2803500

| 6 | Sound becomes loud or weak while driving the vehicle/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Audio unit malfunction (without Bose)
- Audio amplifier malfunction (with Bose)

**Note**

- Inspect the ALC function (with Bose)/Audio pilot function (with Bose) while driving the vehicle with playing the CD, etc.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Does the ALC (Without Bose)/Audio Pilot function (With Bose) turn on? | Yes | Go to the next step. |
| | | No | **Without Bose:**<br>Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ ASSEMBLY.)<br>**With Bose:**<br>Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) |
| 2 | • Turn the ALC (Without Bose)/Audio Pilot function (With Bose).<br>• Does the sound change while driving the vehicle? | Yes | **Without Bose:**<br>Replace the audio unit.<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>(See 09-20-5 AUDIO UNIT DISASSEMBLY/ ASSEMBLY.)<br>**With Bose:**<br>Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) |
| | | No | The system is normal.<br>Explains the ALC (Without Bose)/Audio Pilot function (with Bose) to the customer. |

## NO.7 ALC FUNCTION IS INOPERATIVE[ENTIRE AUDIO SYSTEM]

id0903e2803600

| 7 | ALC function is inoperative/Possible DTC: 16:Er12 |
|---|---|

**Troubleshooting hints**

- Audio unit malfunction
- CAN signal wiring harness malfunction
- Open or short circuit in vehicle speed signal wiring harness (e. g., instrument cluster)

**Note**

- Inspect the ALC function while driving the vehicle with playing the CD, etc.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ALC function to ON.<br>• Inspect the ALC function operation when driving the vehicle at ALC level 3.<br>• Does the ALC system operate properly? | Yes | The system is normal. Explains the ALC function to the customer. |
| | | No | Go to the next step. |
| 2 | • Retrieve the DTCs from all vehicle modules using the M-MDS or equivalent.<br>• Is there the following DTC displayed?<br>— Vehicle speed signal wiring harness<br>— CAN signal wiring harness | Yes | Go to the appropriate DTC inspection. |
| | | No | Replace the audio unit. |

## NO.8 AUDIO PILOT FUNCTION IS INOPERATIVE[ENTIRE AUDIO SYSTEM]

id0903e2825100

| 8 | Audio Pilot function is inoperative |
|---|---|

**Troubleshooting hints**

- Audio amplifier malfunction
- Open or short circuit in Mic unit signal wiring harness
- Open or short circuit in Audio Pilot signal wiring harness

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the Audio Pilot function on.<br>• Inspect the Audio Pilot function operation while driving the vehicle.<br>• Does the Audio Pilot system operation properly? | Yes | The system is normal.<br>Explain the Audio Pilot function to the customer. |
| | | No | Go to the next step. |
| 2 | • Inspect the connection of the audio amplifier connector (40-pin, Mic unit signal).<br>• Inspect both the audio amplifier wiring harness-side connector terminal 3E and 3F (40-pin) for a poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Repair or replace the pins and/or the connector. |
| | | No | Go to the next step. |
| 3 | • Inspect the connection of the Mic unit connector (2-pin).<br>• Inspect the Mic unit wiring harness-side connector terminal A and B (2-pin) for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all pins normal? | Yes | Repair or replace the pins and/or the connector. |
| | | No | Go to the next step. |
| 4 | • Inspect continuity between the following terminals of the audio amplifier connector and Mic unit connector.<br>— Terminal 2A (40-pin)— Terminal A (Mic unit)<br>— Terminal 2B (40-pin)— Terminal B (Mic unit)<br>• Is there continuity? | Yes | Inspect for open or short circuit.<br>Go to the next step. |
| | | No | Repair or replace for open circuit. |
| 5 | • Retrieve the DTCs from all vehicle modules using the M-MDS or equivalent.<br>• Is there the following DTC displayed?<br>— Vehicle speed signal wiring harness<br>— CAN communication wiring harness | Yes | Go to the appropriate DTC inspection. |
| | | No | Replace the audio amplifier.<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) |

## NO.9 AUDIO SYSTEM ILLUMINATION DOES NOT ILLUMINATE AT ALL[ENTIRE AUDIO SYSTEM]

id0903e2825200

| 9 | Audio system illumination does not illuminate at all/Possible DTC: 09:Er20, 21:Er19 |
|---|---|

**Troubleshooting hints**

- Poor connection of audio unit connector, terminal damage
- Audio unit malfunction
- Burnt fuse (TNS signal)
- Open or short circuit in TNS signal wiring harness
- Center panel malfunction

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Are all illumination on the audio unit turned OFF? | Yes | Go to the next step. |
| | | No | Replace the center panel. |
| 2 | • Turn the ignition switch to the LOCK position.<br>• Inspect the fuse (ILLUMI).<br>• Is the fuse normal? | Yes | Go to the Step 4. |
| | | No | Go to the next step. |
| 3 | • Turn the ignition switch to the LOCK position.<br>• Disconnect the audio unit connector (24-pin) and inspect the continuity between the audio unit wiring harness-side connector terminal E (TNS) and the ground.<br>• Is there continuity? | Yes | Repair or replace the short circuit in the suspect wiring harness. After repair the harness, replace with the appropriate standard fuse. |
| | | No | Go to the next step. |
| 4 | • Inspect the connection of the audio unit connector (24-pin).<br>• Inspect both the audio unit and wiring harness-side connector terminal E for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If poor connection of audio unit connector:**<br>• Securely connect the audio unit connector.<br>**If the audio unit side connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 5 | • Connect the audio unit connector (24-pin).<br>• Turn the ignition switch to the ACC position.<br>• Inspect the voltage at the audio unit connector terminal E (TNS).<br>• Is the voltage **B+** when the light switch is turned to the TNS position? | Yes | Replace the audio unit. |
| | | No | Repair or replace the suspect wiring harness (TNS signal). |



## NO.10 LCD DOES NOT DISPLAY AT ALL[ENTIRE AUDIO SYSTEM]

id0903e2825300

| 10 | LCD does not display at all/Possible DTC: 09:Er20, 21:Er19 |
|---|---|

**Troubleshooting hints**

- Audio unit malfunction
- Information display malfunction

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the audio unit to ON.<br>• Press both POWER ON/OFF and SEEK UP buttons for **0.2 seconds** at the same time.<br>• Does the LCD display properly? | Yes | Go to the next step. |
| | | No | Replace the information display. |
| 2 | • Press either CLC or SET/INFO button on the information display.<br>• Does the beep sound? | Yes | Replace the audio unit. |
| | | No | Replace both audio unit and information display. (CAN communication malfunction) |

# 09-03E SYMPTOM TROUBLESHOOTING [RADIO]

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Effect Setting of Separation Control and High Tone Control . . . . . **09-03E–10**

## FOREWORD[RADIO]

id0903e3803900

**Note**

- l If the case location, time, and broadcasting station etc. can be specified through interview with the customer, there is the possibility that the signal reception environment is the cause of the problem.
- Perform confirmation of symptom and evaluation under conditions that customer reported (location, time, broadcasting station etc.). If not possible, perform it under equivalent conditions.
- Before inspection or repair, record the broadcasting stations that customer preset and reset them accordingly after the inspection or repair. Adjust the clock too.



### Troubleshooting Index

| No. | Symptom | Possible DTC |
|---|---|---|
| 1 | No radio reception (AM/FM)/No or low volume | 09:Er20, 09:Er22 |
| 2 | Noise from radio (AM only) | 09:Er22 |
| 3 | Noise from radio (FM only) | 09:Er22 |
| 4 | Cannot tune (SEEK does not stop) | 09:Er20, 09:Er22 |
| 5 | Cannot preset (preset function does not operate) | 21:Er19 |
| 6 | Reception frequency of radio slips | 09:Er22 |

### Quick Diagnostic Chart (Radio)

X: Applicable

| Possible factor \ Troubleshooting item | 1 No radio reception (AM/FM)/No or low volume | 2 Noise from radio (AM only) | 3 Noise from radio (FM only) | 4 Cannot tune (SEEK does not stop) | 5 Cannot preset (preset function does not operate) | 6 Reception frequency of radio slips |
|---|---|---|---|---|---|---|
| Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc) | X | X | X | | | |
| Audio unit | X | X | X | X | X | X |
| Antenna plug poor connection | X | X | X | X | | |
| Antenna feeder | X | X | X | X | | |
| Electronic jamming from outside, or inferior condition of broadcasting station radio wave | X | X | X | X | | X |
| Antenna rod not installed | X | X | X | X | | |
| Noise from electrical system on vehicle (e.g. fuel pump) | | X | X | | | |
| Battery | | X | X | | | |
| Charging system | | X | X | | | |
| Antenna installation loosened | | X | X | | | |
| Center panel | | | | X | X | |

acxuuw00000947

### CONFIRMATION STEP 1: RECEPTION CONDITION SYMPTOM (EXAMPLE)[RADIO]

id0903e3804000

| Symptom | Antenna signal condition | Source |
|---|---|---|
| Only a buzzing sound from the speakers | • There is no broadcasting wave.<br>• Signals from antenna to audio unit are not transmitted. | • Electric noise caused by the operation of internal circuit from audio unit itself<br>• Atmosphere noise |
| A buzzing or crunching sound and normal sound produced at the same time from the speakers | • Though signals are transmitted from antenna to audio unit, electric noise from other sources is larger. | • Electrical noise caused by operation of electrical component on vehicle<br>• Electrical noise from high tension wire, transformer substation (factory), electrical feeder line (street car), or motorcycle. |
| A thumping sound and normal sound produced at the same time from the speakers (FM only) | • Noise occurs due to radio wave environment at specific places (e.g. in valleys between buildings). Noise varies when own vehicle or surrounding vehicles moves. (FM only) | • Interference between direct and reflected waves of FM signals causes noise (Multipass noise). |

### CONFIRMATION STEP 2: ANTENNA SYSTEM SYMPTOM (EXAMPLE)[RADIO]

id0903e3804100

| Possible cause | AM reception condition | FM reception condition |
|---|---|---|
| • Antenna feeder axis, open circuit<br>• Antenna feeder plug not attached | NG: No reception | YES: Reception possible.<br>(Sensitivity decreases, but reception is possible under strong electric field.) |
| • Antenna feeder axis (+) to ground (-), open circuit | NG: No reception | NG: No reception |
| • Antenna feeder and antenna, poor ground | YES: Reception possible<br>(Noise may occur) | YES: Reception possible<br>(Sensitivity decreases, but reception is possible under strong electric field.) |
| • Antenna feeder, jack and plug poor connection | NG: No reception<br>(Depending on connection conditions) | YES: Reception possible<br>(Depending on connection conditions) |

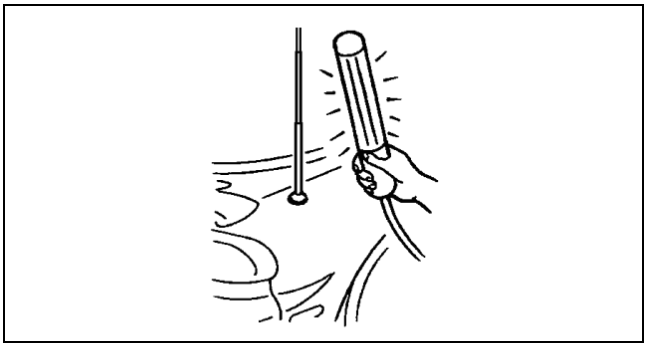
### CONFIRMATION STEP 3: ANTENNA SYSTEM SIMPLE INSPECTION[RADIO]

id0903e3804200

- Because the antenna system is equipped with a capacitor, the continuity cannot be checked. Therefore proceed with the following simple inspection.
  1. Turn the AM radio on.
  2. Tune to the frequency that there is no broadcast and you will hear a buzzing sound.
  3. Turn a fluorescent light on and shake it around the antenna rod (around **10—20 mm**)

**Note**
- Use a fluorescent light type for the inspection. Accurate diagnostic cannot be done with a different type of light.

4. If a whirring sound from the speaker synchronized to the work light movement is confirmed, the antenna system is normal.



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### NO.1 NO RADIO RECEPTION (AM/FM)/NO OR LOW VOLUME[RADIO]

id0903e3804300

| 1 | No radio reception (AM/FM)/no or low volume/Possible DTC: 09:Er20, 09:Er22 |
|---|---|
| **POSSIBLE CAUSE** | • Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.)<br>• Audio unit malfunction<br>• Antenna plug poor connection<br>• Antenna feeder malfunction<br>• Electronic jamming from outside, or inferior condition of broadcasting station radio wave<br>• Antenna rod is not installed |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the audio unit ON.<br>• Is the LCD indicated correctly? | Yes | Go to the Step 3. |
| | | No | Go to the next step. |
| 2 | • Measure voltage at B+ and ACC terminals.<br>• Is voltage okay?<br>**Specification**<br>**With ignition switch ON: 11.5 V or more**<br>**At idling: 12.5 V or more** | Yes | Go to the next step. |
| | | No | Follow diagnostic procedure for symptom No. 2 (Entire audio system). |
| 3 | • Set volume to 10 to 15.<br>• Is buzzing sound or voice confirmed? | Yes | Go to the next step. |
| | | No | Follow diagnostic procedure for symptom No. 3 (Entire audio system) or No. 4 (Entire audio system). |
| 4 | • Tune to local broadcasting station and check reception condition.<br>• Is reception okay? | Yes | Go to the next step. |
| | | No | Go to the Step 6. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | • Push PRESET buttons and check preset conditions.<br>• Has preset been stored? | Yes | The system is normal. |
| | | No | Preset broadcasting stations. |
| 6 | • Is aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) installed?<br><br>**Note**<br>• TV antenna located closely to audio antenna can be cause of noise. Relocate TV antenna. | Yes | Go to the next step. |
| | | No | Go to the Step 8. |
| 7 | • Remove aftermarket electronic equipment.<br>• Turn audio unit ON and check reception condition.<br>• Is reception improved? | Yes | The system is normal.<br>(Explain to customers that aftermarket electronic equipment is cause of noise) |
| | | No | Go to the next step. |
| 8 | • Refer to confirmation step 3, and inspect antenna system.<br>• Is a whirring sound present? | Yes | Replace audio unit. |
| | | No | Go to the next step. |
| 9 | • Inspect antenna plug connection condition.<br>• Is connection okay? | Yes | Go to the next step. |
| | | No | Insert antenna plug securely. |
| 10 | • Turn ignition switch to LOCK position.<br>• Measure continuity between antenna feeder axis and ground.<br>• Is there any continuity? | Yes | Replace antenna feeder. |
| | | No | Go to the next step. |
| 11 | • Compare reception with other audio unit on same model (model/unit) under same problem conditions.<br>• Is reception equivalent between customer's unit and compared unit?<br><br>**Note**<br>• Due to following differences, you may feel difference in reception efficiency.<br>**(Vehicle side factor)**<br>— Antenna installation location, height, feeder wiring routing, optional electrical equipment<br>**(Audio unit factor)**<br>— Volume concern type: It decreases change of volume when signals become weak. (Noise is conspicuous)<br>— Noise decrease type: It decreases volume when signals become weak, so that noise is not conspicuous. | Yes | The system is normal.<br>(It is caused by electronic jamming from outside, or inferior broadcasting station signal condition.) |
| | | No | Replace audio unit. |

## NO.2 NOISE FROM RADIO (AM ONLY)[RADIO]

id0903e3804400

| 2 | Noise from radio (AM only)/Possible DTC: 09:Er22 |
|---|---|
| POSSIBLE CAUSE | • Antenna rod not installed<br>• Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.)<br>• Noise from electrical system on vehicle (e.g. fuel pump)<br>• Battery malfunction<br>• Charging system malfunction<br>• Audio unit malfunction<br>• Antenna plug poor connection<br>• Antenna feeder malfunction<br>• Electronic jamming from outside, or inferior condition of broadcasting station radio wave<br>• Antenna installation loosened |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Tune to local broadcasting station and check reception condition.<br>• Is reception okay? | Yes | Tune to correct frequency of broadcasting station.<br>If not preset, preset it. |
| | | No | Go to the next step. |
| 2 | • Inspect antenna rod condition.<br>• Is antenna rod installed? | Yes | Go to the next step. |
| | | No | Advise customer to install antenna rod when radio is used. |
| 3 | • Is aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) installed?<br><br>**Note**<br>• TV antenna located closely to audio antenna can be cause of noise. Relocate TV antenna. | Yes | Go to the next step. |
| | | No | Go to the Step 5. |
| 4 | • Remove aftermarket electronic equipment.<br>• Turn audio unit ON and check reception condition.<br>• Is reception improved? | Yes | The system is normal. (Explain to customers that aftermarket electronic equipment is cause of noise) |
| | | No | Go to the next step. |
| 5 | • Measure battery voltage.<br>• Is battery voltage okay?<br>**Standard**<br>**With ignition switch ON: 11.5 V or more**<br>**At idling: 12.5 V or more**<br><br>**Note**<br>• Inspect that battery cables are connected to terminals securely. | Yes | Go to the next step. |
| | | No | Charge battery. Inspect charging system, and repair or replace if necessary. |
| 6 | • Is noise occurring only when vehicle electrical system (e.g. fuel pump) operates?<br><br>**Note**<br>• Identify subject electrical component by disconnecting fuse, turning switch ON & OFF, or disconnecting & connecting connector.<br>• It will be easy when simulation function on M-MDS is used. | Yes | Go to the next step. |
| | | No | Go to the Step 8. |
| 7 | • Inspect power supply, ground condition, and noise prevention capacitor for electrical component.<br>• Is noise present after inspection?<br><br>**Note**<br>• Inspect following:<br>— Power supply to electrical component for voltage drop (compare with battery voltage)<br>— Resistance between ground of electrical component and body. (Should be close to 0 ohm)<br>— Installation condition of noise prevention capacitor for fuel pump etc. | Yes | Go to the next step. |
| | | No | Troubleshooting completed.<br><br>**Note**<br>• The audio unit supplies **12 V** battery power to the antenna amplifier for the AM radio reception in the radio mode. The audio unit cannot receive the AM signals without the **12 V** battery power to the antenna amplifier. If the AM signals become strong, the audio unit may receive the signal with noises. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 8 | • Inspect antenna plug connection condition.<br>• Is connection okay? | Yes | Go to the next step. |
| | | No | Insert antenna plug securely. |
| 9 | • Turn ignition switch to LOCK position.<br>• Measure continuity between antenna feeder axis and ground.<br>• Is there any continuity? | Yes | Replace antenna feeder. |
| | | No | Go to the next step. |
| 10 | Compare reception with other audio unit on same model (model/unit) under same problem conditions.<br>• Is reception equivalent between customer's unit and compared unit?<br><br>**Note**<br>• Due to following differences, you may detect a difference in reception efficiency.<br>**(Vehicle side factor)**<br>— Antenna installation location, height, feeder wiring routing, optional electrical equipment<br>**(Audio unit factor)**<br>— Volume concern type: It decreases change of volume when signals become weak. (Noise is conspicuous)<br>— Noise decrease type: It decreases volume when signals become weak, so that noise is not conspicuous. | Yes | The system is normal (It is caused by electronic jamming from outside, or inferior broadcasting station signal condition). |
| | | No | Go to the next step. |
| 11 | • Retighten ground fixation for antenna installation part and antenna amplifier. Retighten antenna rod.<br>• Is noise present, after retightening? | Yes | Replace audio unit. |
| | | No | Troubleshooting completed. |

### NO.3 NOISE FROM RADIO (FM ONLY)[RADIO]

id0903e3804500

| 3 | Noise from radio (FM only)/Possible DTC: 09:Er22 |
|---|---|
| **POSSIBLE CAUSE** | • Antenna rod not installed<br>• Jamming from aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.)<br>• Noise from electrical system on vehicle (e.g. fuel pump)<br>• Battery malfunction<br>• Charging system malfunction<br>• Audio unit malfunction<br>• Antenna plug poor connection<br>• Antenna feeder malfunction<br>• Electronic jamming from outside, or inferior condition of broadcasting station radio wave<br>• Antenna installation loosened<br><br>**Note**<br>• FM broadcast has feature "sound quality is good" and "resistant to noise", but FM broadcast has particular noises. Though audio unit is designed to reduce noise, there are times noise occurs due to conditions. |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Tune to local broadcasting station and check reception condition.<br>• Is reception okay? | Yes | Tune to correct frequency of broadcasting station.<br>If not preset, preset it. |
| | | No | Go to the next step. |
| 2 | • Inspect antenna rod condition.<br>• Is antenna rod installed? | Yes | Go to the next step. |
| | | No | Advise customer to install antenna rod when radio is used. |
| 3 | • Is aftermarket electronic equipment (two-way radio, navigation system, mobile phone, etc.) installed? | Yes | Go to the next step. |
| | | No | Go to the Step 5. |
| 4 | • Remove aftermarket electronic equipment.<br>• Turn audio unit ON and check reception condition.<br>• Is reception improved? | Yes | The system is normal. (Explain to customers that aftermarket electronic equipment is cause of noise) |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 5 | • Measure battery voltage.<br>• Is battery voltage okay?<br>**Standard**<br>**With ignition switch ON: 11.5 V or more**<br>**At idling: 12.5 V or more**<br><br>**Note**<br>• Inspect that battery cables are connected to terminals securely. | Yes | Go to the next step. |
| | | No | Charge battery. Inspect charging system, and repair or replace if necessary. |
| 6 | • Is noise occurring only when vehicle electrical system (e.g. fuel pump) operates?<br><br>**Note**<br>• Identify subject electrical component by disconnecting fuse, turning switch ON & OFF, or disconnecting & connecting connector.<br>• It will be easy when simulation function on M-MDS is used. | Yes | Go to the next step. |
| | | No | Go to the Step 8. |
| 7 | • Inspect power supply, ground condition, and noise prevention capacitor for electrical component.<br>• Is noise present after inspection?<br><br>**Note**<br>• Inspect following:<br>— Power supply to electrical component for voltage drop (compare with battery voltage)<br>— Resistance between ground of electrical component and body. (Should be close to **0 ohm**)<br>— Installation condition of noise prevention capacitor for fuel pump etc. | Yes | Go to the next step. |
| | | No | Troubleshooting completed. |
| 8 | • Inspect antenna plug connection condition.<br>• Is connection okay? | Yes | Go to the next step. |
| | | No | Insert antenna plug securely. |
| 9 | • Turn ignition switch to LOCK position.<br>• Measure continuity between antenna feeder axis and ground.<br>• Is there any continuity? | Yes | Replace antenna feeder. |
| | | No | Go to the next step. |
| 10 | • Compare reception with other audio unit on same model (model/unit) under same problem conditions.<br>• Is reception equivalent between customer's unit and compared unit? | Yes | The system is normal (It is caused by electronic jamming from outside, or inferior broadcasting station signal condition). |
| | | No | Go to the next step. |
| 11 | • Retighten ground fixation for antenna installation part and antenna amplifier. Retighten antenna rod.<br>• Is noise present, after retightening?<br><br>**Note**<br>• When antenna is not grounded perfectly, FM particular noise is likely to be conspicuous. | Yes | Replace audio unit. |
| | | No | Troubleshooting completed. |

## NO.4 CANNOT TUNE (SEEK DOES NOT STOP)[RADIO]

id0903e3804600

| 4 | Cannot tune (SEEK does not stop)/Possible DTC: 09:Er20, 09:Er22 |
|---|---|
| POSSIBLE CAUSE | • Center panel malfunction<br>• Antenna plug poor connection<br>• Antenna feeder malfunction<br>• Audio unit malfunction<br>• Electronic jamming from outside, or inferior condition of broadcasting station radio wave<br>• Antenna rod not installed |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect if feel of SEEK button is normal when button is pushed and released.<br>• Is it okay? | Yes | Go to the next step. |
| | | No | Perform confirmation step 1: audio panel switch confirmation. Replace center panel if necessary. |
| 2 | • Inspect indication of LCD.<br>• Is frequency indication increased or decreased when SEEK button is pushed? | Yes | Go to the next step. |
| | | No | Perform confirmation step 1: audio panel switch confirmation. Replace center panel if necessary. |
| 3 | • Manually tune to local broadcasting station and check reception condition.<br>• Is reception okay? | Yes | Go to the Step 6. |
| | | No | Go to the next step. |
| 4 | • Inspect antenna plug connection condition.<br>• Is connection okay? | Yes | Go to the next step. |
| | | No | Insert antenna plug securely. |
| 5 | • Turn ignition switch to LOCK position.<br>• Measure continuity between antenna feeder axis and ground.<br>• Is there any continuity? | Yes | Replace antenna feeder. |
| | | No | Go to the next step. |
| 6 | • Check if number of broadcasting stations changes depending on time and place.<br>• Does it change? | Yes | The system is normal. (Explain to customer that SEEK sometimes does not stop depending on signal reception condition.)<br><br>**Note**<br>• Signals tend to reach longer distances at night. It is conspicuous in AM signals, several audio functions may stop due to foreign broadcasting station or noise. Though the audio system restrains sensitivity of SEEK and SCAN functions at night, the audio system may select other than desired broadcasting station when signals are considerably strong.This function is linked to the parking light. When the parking light or headlight is turned on, SEEK and SCAN may not function for weak signals. |
| | | No | Replace audio unit. |

## NO.5 CANNOT PRESET (PRESET FUNCTION DOES NOT OPERATE)[RADIO]

id0903e3804700

| 5 | Cannot preset (preset function does not operate)/Possible DTC: 21:Er19 |
|---|---|
| POSSIBLE CAUSE | • Audio unit malfunction<br>• Center panel malfunction |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Tune to desired station and push channel preset button 1 for about 2 seconds to store it.<br>• Repeat above for other stations using channel preset buttons 2 to 5.<br>• Push channel preset button 1 to 6 one by one.<br>• Are stored stations present? | Yes | Go to the next step. |
| | | No | Go to the Step 3. |
| 2 | • Turn ignition switch to LOCK and then to ACC.<br>• Check if preset stations are stored by pushing preset buttons.<br>• Are stations stored? | Yes | The system is normal. (Explain preset procedure to customer using Owner's Manual) |
| | | No | Replace audio unit. |
| 3 | • Remove center panel from audio unit, and reinstall center panel to audio unit.<br>• Turn audio power switch ON.<br>• Press the POWER button and simultaneously press the CLOCK button for **approx. 1s**.<br>• Push all buttons and check if buzzer sounds.<br>• Are all buttons okay? | Yes | Replace audio unit. |
| | | No | Replace center panel. |



## NO.6 RECEPTION FREQUENCY OF RADIO SLIPS[RADIO]

id0903e3804800

| 6 | Reception frequency of radio slip/Possible DTC: 09:Er22 |
|---|---|
| POSSIBLE CAUSE | • Audio unit malfunction<br>• Electronic jamming from outside, or inferior condition of broadcasting station radio wave |

**Diagnostic procedure**

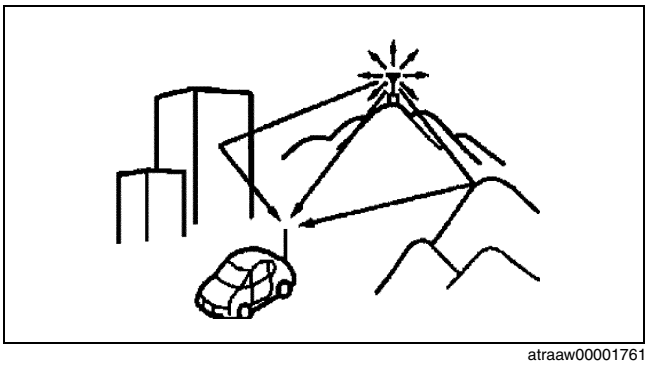
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Push SEEK button and check if desired broadcasting station is tuned.<br>• Is it okay? | Yes | Go to the Step 3. |
| | | No | Go to the next step. |
| 2 | • Check if other broadcasting station is received at certain place when indication of reception frequency stays.<br>• Is other station received?<br><br>**Note**<br>• When you receive weak signal from one broadcasting station and come close to broadcasting antenna which emits strong signal, broadcasting with strong signal is sometimes received. | Yes | Go to the next step. |
| | | No | Replace audio unit. |
| 3 | • Compare reception with other audio unit on same model (model/unit) under same problem conditions.<br>• Is reception equivalent between customer's unit and compared unit? | Yes | Troubleshooting completed (Audio unit is normal). |
| | | No | Replace audio unit. |

**REFERENCE[RADIO]**

id0903e3830000

**1. Multipath Noise**

- Signals from an FM transmitter are a high frequency and similar to beams of light because they do not bend around corners, but they do reflect. Since FM signals can be reflected by obstructions, it is possible to receive both the direct signal and the reflected signal at the same time. This causes a slight delay in reception and may be heard as a broken sound or a distortion.



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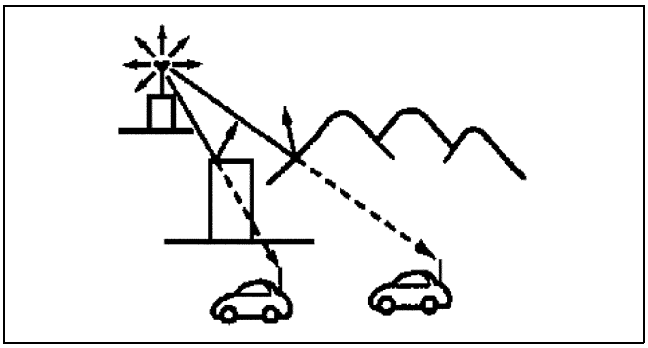
**2. Flutter/Skip Noise**

- Signals become weak in valleys between mountains, tall building, and other obstacles. When the vehicle passes through such an area, the reception conditions may change suddenly, resulting in annoying noise.



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**3. Stereo and Monaural Receptions**

- As signals become weak, noise may appear more in stereo reception. Comparing to stereo reception, noise in monaural receptions is relatively less striking.

**Measures in Audio System**
**Separation control**

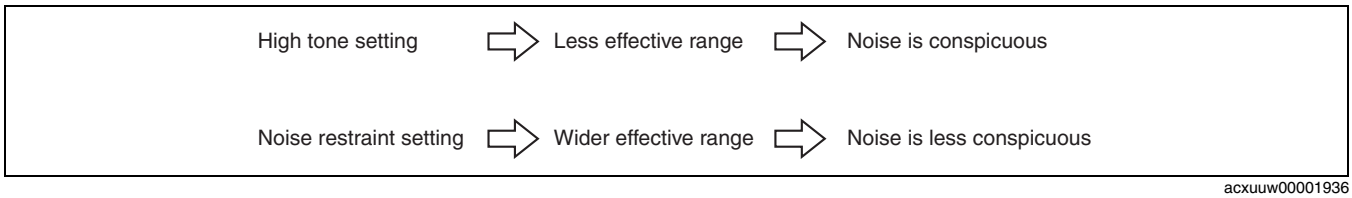
- Utilizing the characteristic of monaural reception that noise is relatively less striking than stereo reception, the audio system automatically changes the reception from stereo to monaural and lessens annoying noise when signals become weak or a multipath phenomenon occurs.

**High tone control**

- When signals become weak or a multipath phenomenon occurs, the audio system restrains volume level in high frequency band and lessens annoying noise.

**Effect Setting of Separation Control and High Tone Control**

- The separation and high tone controls influence sound quality, Therefore they are specifically tuned for individual model. (Comparison of characteristic must be done on the same models)

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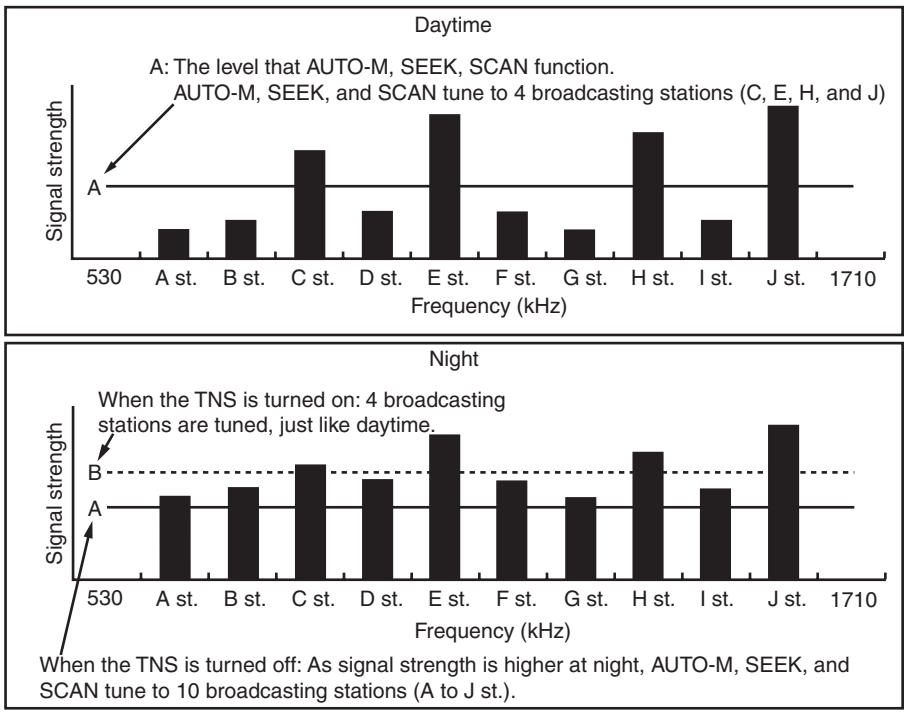
**Remarks**

- Signals tend to reach longer distances at night. It is conspicuous in AM signals, several audio functions may stop due to foreign broadcasting station or noise. Though the audio system restrains sensitivity of SEEK and SCAN functions at night, the audio system may select other than desired broadcasting station when signals are considerably strong. This function is linked to the parking light. When the parking light or headlight is turned on, SEEK and SCAN may not function for weak signals.

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# 09-03F SYMPTOM TROUBLESHOOTING [CASSETTE TAPE PLAYER]

**FOREWORD [CASSETTE TAPE PLAYER] . . . . . 09-03F–1**
Troubleshooting Index . . . . . 09-03F–1
Quick Diagnostic Chart (Cassette Tape Player). . . . . 09-03F–2
**NO.1 NO SOUND FROM THE CASSETTE TAPE [CASSETTE TAPE PLAYER] . . . . . 09-03F–2**
**NO.2 CASSETTE TAPE PLAYER DOES NOT EJECT THE CASSETTE TAPE[CASSETTE TAPE PLAYER]. . . . 09-03F–3**
**NO.3 CASSETTE TAPE PLAYER DOES NOT LOAD THE CASSETTE TAPE[CASSETTE TAPE PLAYER]. . . . 09-03F–3**
**NO.4 CASSETTE TAPE PLAYER EJECTS THE CASSETTE TAPE IMMEDIATELY [CASSETTE TAPE PLAYER] . . . . . 09-03F–4**
**NO.5 WAVERING SOUND AND/OR POOR SOUND QUALITY OF THE CASSETTE TAPE [CASSETTE TAPE PLAYER] . . . . . 09-03F–4**
**NO.6 THERE IS A NOISE WHEN PLAYING THE CASSETTE TAPE PLAYER [CASSETTE TAPE PLAYER] . . . . . 09-03F–5**
**NO.7 POOR SOUND QUALITY (POOR TREBLE SOUND) [CASSETTE TAPE PLAYER] . . . . . 09-03F–5**
**NO.8 ABNORMAL SOUND OF THE CASSETTE TAPE (PLAY BACKWARDS) [CASSETTE TAPE PLAYER] . . . . . 09-03F–6**

## FOREWORD[CASSETTE TAPE PLAYER]

id0903e4804900

### Troubleshooting Index

| No. | Symptom | Possible DTC |
|---|---|---|
| 1 | No sound from the cassette tape | 00:Er01, 00:Er03, 00:Er10 |
| 2 | Cassette tape player does not eject the cassette tape | 00:Er01, 00:Er04, 00:Er10 |
| 3 | Cassette tape player does not load the cassette tape | 00:Er01, 00:Er10 |
| 4 | Cassette tape player ejects the cassette tape immediately | 00:Er04, 00:Er10 |
| 5 | Wavering sound and/or poor sound quality from the cassette tape | — |
| 6 | There is a noise when playing the cassette tape player | — |
| 7 | Poor sound quality (Poor treble sound) | — |
| 8 | Abnormal sound from the cassette tape (Reverse playback) | — |

### Quick Diagnostic Chart (Cassette Tape Player)

X: Applicable

| Troubleshooting item / Possible factor | 1 No sound from the cassette tape | 2 Cassette tape player does not eject the cassette tape | 3 Cassette tape player does not load the cassette tape | 4 Cassette tape player ejects the cassette tape immediately | 5 Wavering sound and/or poor sound quality of the cassette tape | 6 There is a noise when playing the cassette tape player | 7 Poor sound quality (Poor treble sound) | 8 Abnormal sound from the cassette tape (Reverse playback) |
|---|---|---|---|---|---|---|---|---|
| Tape head gathers oxide residue from cassette tape | X | | | | | | X | |
| Cassette tape is malfunctioning | X | X | X | X | X | X | X | X |
| Cassette tape player is malfunctioning | X | X | X | X | X | X | X | X |
| Cassette patch is broken | | X | X | | | | | |
| Poor installation of cassette patch | | X | X | | | | | |
| Poor connection of cassette tape player connector | | | X | | | X | | |
| Dolby noise reduction is used improperly | | | | | | X | X | |
| The after-market electrical parts interfere with the audio system | | | | | | X | | |

acxuuw00000949

### NO.1 NO SOUND FROM THE CASSETTE TAPE[CASSETTE TAPE PLAYER]

id0903e4805000

| 1 | **No sound from the cassette tape/Possible DTC: 00:Er01, 00:Er03, 00:Er10** |
|---|---|

**Troubleshooting hints**

- Tape head gathers oxide residue from cassette tape
- Cassette tape is malfunctioning
- Cassette tape player is malfunctioning

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Replace with the cassette tape known to be good.<br>• Does the cassette tape player sound? | Yes | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning. |
| | | No | Go to the next step. |
| 2 | • Clean the tape head using a good quality head-cleaning tape.<br>• Does the cassette tape produce sound? | Yes | Explain the repairs (head cleaning) to the customer. |
| | | No | Replace the cassette tape player. |

## NO.2 CASSETTE TAPE PLAYER DOES NOT EJECT THE CASSETTE TAPE[CASSETTE TAPE PLAYER]

id0903e4805100

| 2 | Cassette tape player does not eject the cassette tape/Possible DTC: 00:Er01, 00:Er04, 00:Er10 |
|---|---|

**Troubleshooting hints**

- Cassette tape is malfunctioning.
- Cassette tape player is malfunctioning.
- Cassette patch is broken.
- Poor installation of cassette patch.

**Note**

- The cassette tape player may not eject the cassette tape due to tape slack, peel-off or adhered seal.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Press the eject button on the player.<br>• Is a “TAPE OUT” message displayed? | Yes | Go to the next step. |
| | | No | Replace the cassette patch. |
| 2 | • Visually inspect the dust cover on the cassette patch.<br>• Is there any damage on the cover? | Yes | Replace the cassette patch. |
| | | No | Go to the next step. |
| 3 | • Inspect the cassette patch installation.<br>• Is the cassette patch installed securely?<br>**Note**<br>• Inspect the connector for poor connection (such as damaged/bent/pulled-out pins, corrosion). | Yes | Replace the cassette tape player.<br>**Note**<br>• When replacing the cassette tape player, inspect the following:<br>— Label is not peeling off<br>— Cassette patch is normal |
| | | No | Install the cassette patch securely.<br>If the cassette patch is broken, replace the cassette patch. |

09-03F

## NO.3 CASSETTE TAPE PLAYER DOES NOT LOAD THE CASSETTE TAPE[CASSETTE TAPE PLAYER]

id0903e4825500

| 3 | Cassette tape player does not load the cassette tape/Possible DTC: 00:Er01, 00:Er10 |
|---|---|

**Troubleshooting hints**

- Cassette tape is malfunctioning
- Cassette tape player is malfunctioning
- Cassette patch is broken
- Poor installation of cassette patch
- Poor connection of cassette tape player connector

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Visually inspect the cassette tape.<br>• Is the cassette tape normal? | Yes | Go to the Step 3. |
| | | No | Go to the next step. |
| 2 | • Inspect the cassette tape player connector.<br>• Does the cassette tape player load the cassette tape after re-connecting the connector? | Yes | The cassette tape player is normal. Explain the repairs to the customer. |
| | | No | Replace the cassette tape player. |
| 3 | • Replace with a cassette tape known to be good.<br>• Does the cassette tape player load the cassette tape? | Yes | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning. |
| | | No | Go to the next step. |
| 4 | • Visually inspect the dust cover on the cassette patch (damage, cracks.).<br>• Is the dust cover normal? | Yes | Replace the cassette tape player. |
| | | No | Replace the cassette patch. |

## NO.4 CASSETTE TAPE PLAYER EJECTS THE CASSETTE TAPE IMMEDIATELY[CASSETTE TAPE PLAYER]

id0903e4825600

| 4 | Cassette tape player ejects the cassette tape immediately/Possible DTC: 00:Er04, 00:Er10 |
|---|---|

**Troubleshooting hints**

- Cassette tape is malfunctioning
- Cassette tape player is malfunctioning

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Replace with a cassette tape known to be good.<br>• Does the cassette tape player eject the cassette tape immediately? | Yes | Replace the cassette tape player. |
| | | No | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning (Tape slack, breakage.). |

## NO.5 WAVERING SOUND AND/OR POOR SOUND QUALITY OF THE CASSETTE TAPE[CASSETTE TAPE PLAYER]

id0903e4825700

| 5 | Wavering sound and/or poor sound quality of the cassette tape/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Cassette tape is malfunctioning.
- Cassette tape player is malfunctioning.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Replace with a cassette tape known to be good.<br>• Is the sound normal? | Yes | Go to the next step. |
| | | No | Replace the cassette tape player. |
| 2 | • Fast-forward and rewind the original tape.<br>• Is the sound normal? | Yes | The cassette tape player is normal.<br>**Note**<br>• If the tape is fast-forwarded/rewound fast-forward/ rewind for a short period repeatedly, the tape playing speed may be temporarily changed. |
| | | No | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning. |

## NO.6 THERE IS A NOISE WHEN PLAYING THE CASSETTE TAPE PLAYER[CASSETTE TAPE PLAYER]

id0903e4825800

| 6 | There is a noise when playing the cassette tape player/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Cassette tape is malfunctioning
- Cassette tape player is malfunctioning
- Poor connection of cassette tape player connector
- Dolby noise reduction is used improperly
- The after-market electrical parts interfere with the audio system

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Set the Dolby noise reduction properly.<br>• Is there any noise? | Yes | Go to the next step. |
| | | No | Set the Dolby noise reduction correctly. |
| 2 | • Replace with a cassette tape known to be good.<br>• Is there any noise? | Yes | Go to the next step. |
| | | No | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning. |
| 3 | • Inspect and re-connect the cassette tape player connector.<br>• Is there any noise? | Yes | Go to the next step. |
| | | No | The cassette tape player is normal. Explain the repairs to the customer. |
| 4 | • Are any of the following after-market electrical parts on the vehicle?<br>— Cellular phone<br>— Radio-wave equipment<br>— Remote engine starter<br>— TV | Yes | Go to the next step. |
| | | No | Replace the cassette tape player. |
| 5 | • Remove the after-market electrical parts.<br>• Is there any noise? | Yes | Replace the cassette tape player. |
| | | No | The cassette tape player is normal. Explain to the customer that the after-market electrical parts interfere with the audio system. |

09-03F

## NO.7 POOR SOUND QUALITY (POOR TREBLE SOUND)[CASSETTE TAPE PLAYER]

id0903e4825400

| 7 | Poor sound quality (Poor treble sound)/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Tape head gathers oxide residue from cassette tape
- Cassette tape is malfunctioning
- Cassette tape player is malfunctioning
- Dolby noise reduction is used improperly

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the Dolby noise reduction mode.<br>• Is the Dolby noise reduction mode set correctly? | Yes | Go to the Step 3. |
| | | No | Go to the next step. |
| 2 | • Set the Dolby reduction mode correctly.<br>• Is the sound improved? | Yes | Set the Dolby noise reduction correctly. |
| | | No | Go to the next step. |
| 3 | • Replace with a cassette tape known to be good.<br>• Is the sound improved? | Yes | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning.<br>**Note**<br>• Sound quality deteriorates on cassettes that have been played over a long period of time. |
| | | No | Go to the next step. |
| 4 | • Clean the tape head using the good quality head-cleaning tape.<br>• Is the sound improved? | Yes | Explain the repairs (head cleaning) to the customer. |
| | | No | Replace the cassette tape player. |

## NO.8 ABNORMAL SOUND OF THE CASSETTE TAPE (PLAY BACKWARDS)[CASSETTE TAPE PLAYER]

id0903e4825900

| 8 | Abnormal sound of the cassette tape (Reverse playback)/Possible DTC: — |
|---|---|

**Troubleshooting hints**

- Cassette tape is malfunctioning
- Cassette tape player is malfunctioning

**Note**

- Reverse playback is when the cassette tape is played in the opposite direction of the current playback direction.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Replace with a cassette tape known to be good.<br>• Is the sound normal? | Yes | The cassette tape player is normal. Explain to the customer that the cassette tape is malfunctioning. |
| | | No | Replace the cassette tape player. |

# 09-03G SYMPTOM TROUBLESHOOTING [CD PLAYER/CHANGER]

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## FOREWORD[CD PLAYER/CHANGER]

id0903e5826000



### Troubleshooting Index

| No. | Items | Symptom | Possible DTC |
|---|---|---|---|
| 1 | CD player/changer | CD player/changer does not load the CD or ejects the CD immediately | 03:Er01, 03:Er10 |
| 2 | | CD player/changer does not eject the CD | 03:Er01 |
| 3 | | CD player/changer does not play the CD/No sound | 03:Er07, 03:Er10 |
| 4 | | Sound jumps | 03:Er02 |
| 5 | | CD player/changer scratches on the CD | 03:Er02 |
| 6 | CD changer | Disc changer is inoperative | — |
| 7 | MP3 applicable CD player | CD player does not play the MP3-formatted file | — |
| 8 | | MP3-formatted file folder selection is inoperative/Track search is inoperative | — |
| 9 | | CD player does not indicate the MP3 title text | — |
| 10 | | CD player does not play the audio data (CDDA) | — |
| 11 | CD player/changer | Track change is inoperative | 03:Er02 |

X: Applicable

| Troubleshooting Item / Possible factor | CD player/changer | | | | | CD changer | MP3 applicable CD player | | | | CD player/changer |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| | CD player/changer dose not load the CD or ejects the CD immediately | CD player/changer dose not eject the CD | CD player/changer dose not play the CD/No sound | Sound jumps | CD player/changer scratches on the CD | Disc change is inoperative | CD player dose not play the MP3-formatted file | MP3-formatted file folder selection is inoperative/ Track search is inoperative | CD player dose not indicate the MP3 title text | CD player dose not play the audio data (CODA) | Track change is inoperative |
| CD is inserted upside down | X | | X | | | | | | | | |
| Audio unit is malfunctioning | X | X | X | X | X | X | | | | | X |
| Defective CD (egg., cracked, badly bent, rough edges, scratch, dirty CD, condensation) | X | X | X | X | | | | | | | X |
| Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc) | X | X | X | | | | | | | | X |
| Poor connection of audio unit connector or terminal (e.g., damaged, bent, pull-out pin, corrosion) | X | X | | | | | | | | | |
| Improper center panel installation | | X | | | | X | | | | | |
| Improper CD cover installation | | X | | | | | | | | | |
| Improper audio unit installation (e.g., rattle, loose) | | | | X | | | | | | | |
| Inadequate tire pressure | | | | X | | | | | | | |
| Deformed disc is used (e.g., out of specification (thickness), bent disc) | X | X | | | X | | | | | | |
| Multiple CDs are inserted into the CD player at the same time | | X | | | X | | | | | | |
| Center panel is malfunctioning | | | | | | X | | | | | X |
| CD-R/RW written format is out of specification | | | | | | | X | | | X | |
| MP3 and other format data are in the CD-R/RW | | | | | | | X | | | | |
| File extension for MP3-formatted file is incorrect (Correct: ".mp3", Incorrect: e.g., RIFF) | | | | | | | X | | | | |
| Defective CD-R/RW (e.g., dirty, scratch) | | | | | | | X | X | X | X | |
| CD-R/RW (MP3 files are all written to RIFF format) | | | | | | | X | | | | |
| Conflict of ID tag version for CD-R/RW | | | | | | | | X | X | | |
| Improper folder and/or music title in CD-R/RW | | | | | | | | X | | | |
| The number of characters of folder/music file name in CD-R/RW exceeds the maximum number of characters | | | | | | | | X | X | | |
| Improper encode in CD-R/RW | | | | | | | | X | X | | |
| MP3 applicable CD player is malfunctioning | | | | | | | X | X | X | X | X |
| No title input in CD-R/RW | | | | | | | | | X | | |
| Input title text by 2-bytes characters | | | | | | | | | X | | |
| Data other than the audio data is in CD-R/RW | | | | | | | | | | X | |

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## NO.1 CD PLAYER/CHANGER DOES NOT LOAD THE CD OR EJECTS THE CD IMMEDIATELY[CD PLAYER/CHANGER]

id0903e5826100

| 1 | **CD player/changer does not load the CD or ejects the CD immediately**<br>**Possible DTC: 03:Er01, 03:Er10** |
|---|---|

**Troubleshooting hints**

- CD is inserted upside down
- Audio units is malfunctioning
- Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation)
- Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc)
- Poor connection of audio unit connector or terminal (e.g., damaged, bent, pulled-out pin, corrosion)
- Deformed disc is used (e.g., out of specification (thickness), bent disc)

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is CD inserted properly, label-side up? | Yes | Go to the next step. |
| | | No | Explain to the customer that CD should be inserted into the slot, label-side up. |
| 2 | • Replace with a CD known to be good.<br>• Does the CD player/changer load the CD? | Yes | Go to the next step. |
| | | No | Replace the audio unit. |
| 3 | • Visually inspect the CD.<br>— Is there any dirt, scratch or deformation on the CD?<br>— Is the CD a non-conventional disc? | Yes | Explain to the customer that the defective CD or non-conventional disc cannot be use. |
| | | No | Go to the next step. |
| 4 | • Turn the ignition switch to the LOCK position.<br>• Inspect the connection of the audio unit connector (24-pin).<br>• Inspect both audio unit connector and wiring harness-side connector for poor connection. (such as damaged/bent/pulled-out pins, corrosion)<br>• All the pins and connector normal? | Yes | Replace the audio unit. |
| | | No | **If the audio unit connector/pin is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector/pin is wrong:**<br>• Repair or replace the pins and/or the connector. |

## NO.2 CD PLAYER/CHANGER DOES NOT EJECT THE CD[CD PLAYER/CHANGER]

id0903e5826200

| 2 | **CD player/changer does not eject the CD**<br>**Possible DTC:03:Er01** |
|---|---|

**Troubleshooting hints**

- Audio units is malfunctioning
- Defective CD. (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation)
- Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc)
- Poor connection of audio unit connector or terminal (e.g., damaged, bent, pulled-out pin, corrosion)
- Improper center panel installation
- Improper CD cover installation
- Deformed disc is used (e.g., out of specification (thickness), bent disc).
- Multiple CDs are inserted into the CD player at the same time

**Note**

- The CD may be malfunctioning if the CD player/changer does not eject the certain CD only. Inspect the CD player/changer operation using the CD known to be good.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the operation of the audio system other than CD player/changer (e.g. Radio).<br>• Does other audio system operate? | Yes | Go to Step 3. |
| | | No | Go to the next step. |
| 2 | • Turn the ignition switch to the LOCK position.<br>• Inspect the connection of the audio unit connector (24-pin).<br>• Inspect both audio unit connector and wiring harness-side connector for poor connection. (such as damaged/bent/pulled-out pins, corrosion)<br>• All the pins and connector normal? | Yes | Go to the next step. |
| | | No | **If the audio unit connector/pin is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector/pin is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 3 | • Eject the CD.<br>• Is the CD ejected from the CD player/changer? | Yes | Go to the next step. |
| | | No | Inspect the center panel and CD cover installation. Securely install the center panel and/or CD cover as necessary. |
| 4 | • Insert the CD into the CD player/changer.<br>• Does the CD insert into the CD player/changer smoothly? | Yes | Replace the audio unit. |
| | | No | Install the center panel and/or CD cover properly, then go to the next step. |
| 5 | • Is the CD ejected from the CD player/changer? | Yes | Troubleshooting completed.<br>Explain repairs to the customers. |
| | | No | Replace the audio unit. |

## NO.3 CD PLAYER/CHANGER DOES NOT PLAY THE CD/NO SOUND[CD PLAYER/CHANGER]

id0903e5806100

| 3 | **CD player/changer does not play the CD/No sound**<br>**Possible DTC:03:Er07, 03:Er10** |
|---|---|

**Troubleshooting hints**

- CD is inserted upside down
- Audio units is malfunctioning
- Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation)
- Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc)

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the radio ON and inspect that there is sound.<br>• Is there sound?<br>**Note**<br>• Check for the volume dial position. | Yes | Go to the next step. |
| | | No | Go to the symptom troubleshooting No.3 (Audio system). |
| 2 | • Was CD inserted properly, label-side up? | Yes | Go to the next step. |
| | | No | Explain to the customer that CD should be inserted into the slot, label-side up. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | • Replace the CD known to be good.<br>• Does the CD player/changer load the CD? | Yes | Go to the next step. |
| | | No | Replace the audio unit. |
| 4 | • Visually inspect the CD.<br>— Is there any dirt, scratch or deformation on the CD?<br>— Is the CD a non-conventional disc?<br>— Is there a CD in MP3 recording? | Yes | Explain to the customer that the defective CD or non-conventional disc cannot be use. |
| | | No | Replace the audio unit. |

### NO.4 SOUND JUMPS[CD PLAYER/CHANGER]

id0903e5806200

| 4 | **Sound jumps**<br>**Possible DTC:03:Er02** |
|---|---|

**Troubleshooting hints**

- Audio unit is malfunctioning
- Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation)
- Improper audio unit installation (e.g., rattle, loose)
- Inadequate tire pressure

**Note**

- The CD may be malfunctioning if the sound jumps on the certain CD only. Inspect the CD player/changer operation using the CD known to be good.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Does the sound jump when the vehicle is stopped? | Yes | Go to the Step 6. |
| | | No | Go to the next step. |
| 2 | • Drive the vehicle.<br>• Does the sound jump when driving over uneven surfaces? | Yes | Go to the next step. |
| | | No | Go to the Step 6. |
| 3 | • Is the audio unit installed securely? | Yes | Go to the next step. |
| | | No | Install the audio unit securely. |
| 4 | • Inspect the tire pressure.<br>• Is the tire pressure normal? | Yes | Replace the audio unit. |
| | | No | Go to the next step. |
| 5 | • Adjust the tire pressure within specification.<br>• Does the sound jump when driving the vehicle? | Yes | Replace the audio unit. |
| | | No | Audio system is normal. Explain repairs to the customers. |
| 6 | • Replace the CD known to be good.<br>• Does the sound jump when driving the vehicle? | Yes | Replace the audio unit. |
| | | No | Audio system is normal. Explain to the customer that the CD is malfunctioning. |

### NO.5 CD PLAYER/CHANGER SCRATCHES ON THE CD[CD PLAYER/CHANGER]

id0903e5806300

| 5 | **CD player/changer scratches on the CD**<br>**Possible DTC:03:Er02** |
|---|---|

**Troubleshooting hints**

- Audio unit is malfunctioning
- Deformed disc is used (e.g., out of specification (thickness), bent disc)
- Multiple CDs are inserted into the CD player at the same time

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Were the multiple CDs inserted into the CD player at the same time? | Yes | Explain to the customer to insert a CD one by one. |
| | | No | Go to the next step. |
| 2 | • Visually inspect the CD.<br>• Is the CD a deformed disc (e.g., out of specification (thickness), bent disc)? | Yes | Audio system is normal. Explain to the customer that the CD is malfunctioning. |
| | | No | Replace the audio unit. |

## NO.6 DISC CHANGE IS INOPERATIVE[CD PLAYER/CHANGER]

id0903e5806400

| 6 | **Disc change is inoperative**<br>**Possible DTC:—** |
|---|---|

**Troubleshooting hints**

- Audio unit is malfunctioning
- Improper center panel installation
- Center panel is malfunctioning

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the CD changer operation.<br>• Does the CD changer operate properly? | Yes | Go to the next step. |
| | | No | Go to the symptom troubleshooting “No.3 CD player/ changer does not play the CD/No sound”. |
| 2 | • Inspect the followings:<br>— Is the display shown properly when operating the disc change button?<br>— Does the radio band selection operate properly? | Yes | Replace the audio unit. |
| | | No | Go to the next step. |
| 3 | • Inspect the center panel installation.<br>• Does the CD changer change the disc properly after re-installing the center panel? | Yes | Install the center panel securely and properly. |
| | | No | Go to the “No.1 Audio panel switch inspection” in this section. Replace the center panel as necessary. |

## NO.7 CD PLAYER DOES NOT PLAY THE MP3-FORMATTED FILE[CD PLAYER/CHANGER]

id0903e5806500

| 7 | **CD player does not play the MP3-formatted file**<br>**Possible DTC:—** |
|---|---|

**Troubleshooting hints**

- CD-R/RW written format is out of specification
- MP3 and other format data are in the CD-R/RW
- File extension for MP3-formatted file is incorrect (Correct. “.mp3”, incorrect: e.g., RIFF)
- Defective CD-R/RW (e.g. dirty CD, scratch)
- MP3 applicable CD player is malfunctioning

**Note**

- The free-software for the MP3-formatted file in the field may cause the deterioration of sound quality, noise, or defective play, so that the CD player won’t play the customer made MP-3-formatted file.
- The CD player may not play the CD-R/RW properly due to the disc condition.
- If there are MP-3-formatted file and other file in the same disc, the CD player may not play the disc.
- If there are MP-3-formatted file and audio data in the same disc, the CD player loads and plays the first session of the data only.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Inspect the written format of the recorded data on the CD-R/RW.<br>• Is the written format correct? | Yes | Go to the next step. |
| | | No | Write the CD-R/RW with the correct specification. |
| 2 | • Inspect the recorded data in the CD-R/RW.<br>• Is there MP3 and other format data in the CD-R/RW. | Yes | Replace with the CD-R/RW known to be good (MP3-formatted file data only), then inspect the CD player operation.<br>**If the CD player plays the MP3-formatted file:**<br>• Audio system is normal. Explain to the customer that the CD player does not operate properly if the MP3 and other format data are in the CD-R/RW.<br>**If the CD player does not play the MP3-formatted file:**<br>• Replace the audio unit. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 3 | • Inspect the CD-R/RW written format.<br>• Is the written format within the specification (".mp3" is the correct file extension)? | Yes | Replace with the CD-R/RW using the ".mp3" file extension, then inspect the CD player operation.<br>**If the CD player plays the MP3-formatted file:**<br>• Audio system is normal. Explain to the customer that the CD player does not operate properly if the correct file extension is not used.<br>**If the CD player does not play the MP3-formatted file:**<br>• Replace the audio unit. |
| | | No | Go to the next step. |
| 4 | • Visually inspect the CD-R/RW.<br>• Is there any dirt or scratch on the CD-R/RW? | Yes | Clean the disc or replace with the CD-R/RW known to be good. |
| | | No | Replace the audio unit. |

### NO.8 MP3-FORMATTED FILE FOLDER SELECTION IS INOPERATIVE/TRACK SEARCH IS INOPERATIVE[CD PLAYER/CHANGER]

id0903e5806600

| 8 | **MP3-formatted file folder selection is inoperative/track search is inoperative**<br>**Possible DTC:—** |
|---|---|

**Troubleshooting hints**

- Defective CD-R/RW (e.g. dirty CD, scratch)
- Conflict of ID tag version for CD-R/RW
- Improper folder and/or music title in CD-R/RW
- The number of characters of folder/audio file name in CD-R/RW exceeds the maximum number of characters
- Improper encode in CD-R/RW
- MP3 applicable CD player is malfunctioning

09-03G

**Note**

- ID3 is a tagging format for MP3-formatted file. ID3 allows metadata (e.g., title, artist, track number, etc.) to be added to the MP3-formatted file.
- There are two versions in the ID tag.
  - — ID3v1: This is the most widespread standard tag formats and most software is compatible with this version. There is a limitation on the maximum number of characters for the text data.
  - — ID3v2: There are a variety of version in V2, but there is no interchangeability among the versions.

**Limitation on the maximum number of characters for the text data (ID3v1)**

| Item | Maximum number of characters | Description |
|---|---|---|
| Title | 30 | Music title |
| Artist | 30 | Artist name |
| Album | 30 | Album title |
| Year | 4 | Album produced year/CD wholesale year |
| Genre | — | Music category selection |
| Comment | 30 | Free comment |
| Track | 3 | Track number |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Visually inspect the CD-R/RW.<br>• Is there any dirt or scratch on the CD/R/RW? | Yes | Clean the disc or replace with the CD-R/RW known to be good. |
| | | No | Go to the next step. |
| 2 | • Inspect the ID tag version.<br>• Is ID tag correct? | Yes | Go to the next step. |
| | | No | Write the CD-R/RW with the correct ID tag version. |
| 3 | • Inspect folder and audio file name.<br>• Are all file name input correctly? | Yes | Go to the next step. |
| | | No | Use the CD-R/RW that a folder and audio file name is input correctly. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | • Inspect the encode for the folder and audio file name in the CD-R/RW.<br>• Is the encode correct?<br><br>**Note**<br>• Unreadable characters may be displayed if incorrect encode is used. | Yes | Go to the next step. |
| | | No | Use the correct encode. |
| 5 | • Inspect the number of characters for the folder and audio file name.<br>• Is the number of characters within the maximum number of characters? | Yes | Replace the audio unit. |
| | | No | Input the folder and audio file name within the maximum number of characters. |

### NO.9 CD PLAYER DOES NOT INDICATE THE MP3 TITLE TEXT[CD PLAYER/CHANGER]

id0903e5806700

| 9 | **CD player does not indicate the MP3 title text**<br>**Possible DTC:—** |
|---|---|

**Troubleshooting hints**

- Defective CD-R/RW (e.g. dirty CD, scratch)
- Conflict of ID tag version for CD-R/RW
- The number of characters of folder/audio file name in CD-R/RW exceeds the maximum number of characters
- Improper encode in CD-R/RW
- MP3 applicable CD player is malfunctioning
- No title input in CD-R/RW
- Input title text by 2-bytes characters

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Visually inspect the CD-R/RW.<br>• Is there any dirt or scratch on the CD/R/RW? | Yes | Clean the disc or replace with the CD-R/RW known to be good. |
| | | No | Go to the next step. |
| 2 | • Inspect the display the LCD.<br>• Is the CD (other than MP3 compatible) displayed on the LCD? | Yes | Go to the next step. |
| | | No | Go to the symptom troubleshooting No.9 (Entire audio system). |
| 3 | • Inspect the ID tag version.<br>• Is the ID tag correct? | Yes | Go to the next step. |
| | | No | Write the CD-R/RW with the correct ID tag version. |
| 4 | • Is the title text input into the CD-R/RW? | Yes | Go to the next step. |
| | | No | Input the title text.<br><br>**Note**<br>• Do not input the title text by two-bytes character. |
| 5 | • Inspect the encode for the folder and audio file name in the CD-R/RW.<br>• Is the encode correct? | Yes | Go to the next step. |
| | | No | Use the correct encode. |
| 6 | • Inspect the number of characters for the folder and audio file name.<br>• Is the number of characters within the maximum number of characters? | Yes | Replace the audio unit. |
| | | No | Input the folder and audio file name within the maximum number of characters. |

## NO.10 CD PLAYER DOES NOT PLAY THE AUDIO DATA (CDDA)[CD PLAYER/CHANGER]

id0903e5806800

| 10 | **CD player does not play the audio data (CDDA)**<br>**Possible DTC:—** |
|---|---|

**Troubleshooting hints**

- CD-R/RW written format is out of specification
- Defective CD-R/RW (e.g., dirty CD, scratch)
- MP3 applicable CD player is malfunctioning
- Data other than the audio data is in CD-R/RW

**Note**

- The CD player may not play the CD-R/RW properly due to the disc condition.
- If there are MP-3-formatted file and audio data in the same disc, the CD player loads and plays the first session of the data only.

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Replace with the audio-CD known to be good.<br>• Does the CD player play the audio-CD properly? | Yes | Go to the next step. |
| | | No | Replace the audio unit. |
| 2 | • Inspect the written format of the recorded data on the CD-R/RW.<br>• Is the written format correct? | Yes | Go to the next step. |
| | | No | Write the CD-R/RW with the correct specification. |
| 3 | • Inspect the recorded data in the CD-R/RW.<br>• Is any data other than the audio data recorded in the CD-R/RW? | Yes | Replace with the CD-R/RW known to be good (record audio data only), then inspect the CD player operation.<br>**If the CD-R/RW plays:**<br>• Audio system is normal. Explain to the customer that the CD player does not operate properly if the audio data and other data are recorded in the CD-R/RW.<br>**If the CD-R/RW does not play:**<br>• Replace the audio unit. |
| | | No | Go to the next step. |
| 4 | • Visually inspect the CD-R/RW.<br>• Is there any dirt or scratch on the CD-R/RW? | Yes | Clean the disc or replace with the CD-R/RW known to be good. |
| | | No | Replace the audio unit. |



## NO.11 TRACK CHANGE IS INOPERATIVE[CD PLAYER/CHANGER]

id0903e5806900

| 11 | **Track change is inoperative**<br>**Possible DTC:03:Er02** |
|---|---|

**Troubleshooting hints**

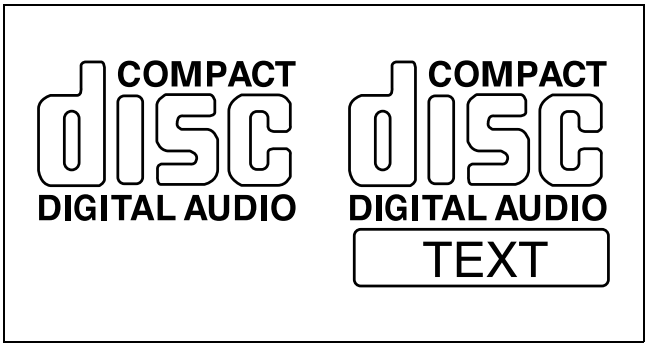
- Audio unit is malfunctioning
- Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD, condensation)
- Non-conventional discs (e.g., 8 cm (3 in) CD, 8 cm (3 in) disc adapter, heart-shaped disc, octagonal disc)
- Center panel is malfunctioning
- MP3 applicable CD player is malfunctioning

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Replace the CD known to be good.<br>• Does the CD player change the track? | Yes | Explain to the customer that the defective CD or non-conventional disc cannot be used. |
| | | No | Go to the next step. |
| 2 | • Inspect the center panel installation.<br>• Does the CD player change the track number on the display when pressing the track up or down button? | Yes | Replace the audio unit. |
| | | No | Go to the “No.1 Audio panel switch inspection” in this section.Replace the center panel as necessary. |

**REFERENCE[CD PLAYER/CHANGER]**

id0903e5830000

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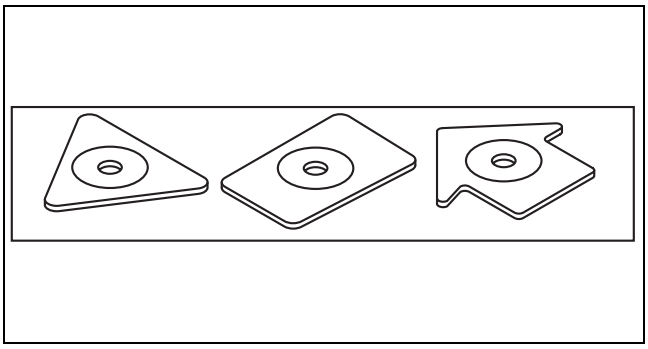
- The CD player/changer has been designed to play CDs bearing the identification logo, COMPACT DISC DIGITAL AUDIO, as shown. No other discs can be played on the CD player/changer other than MP3 applicable one.
- The CD player/changer may not play the following CD:
  - — Defective CD (e.g., cracked, badly bent, rough edges, scratch, dirty CD condensation)
  - — 8 cm (3 in) CDs accessories (e.g., 8 cm (3 in) disc adapter, sticker, label)
  - — Nonstandard CD (e.g., Diameter/thickness is out of specification)
    Specification: 119.7— 120.3 mm (4.668— 4.692 in) of diameter, 12+0.3 or -0.1 mm (0.047+0.012 or 0.004 in) of thickness
- Do not use non-conventional discs. The CD player/changer could be damaged.

**Examples:**

- Although the same physical size as the compact disc, SACD uses a different kind of digital audio signal, Direct Stream Digital.
- The CD player/changer may not play the CD-R/RW properly due to the disc condition (excluding the MP3).



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**MP3-Formatted File**
**Outline of CD-R and CD-RW**

- Definition
  - — CD-R: The CD-R is a non-rewritable version. Once a section of a CD-R is written, it cannot be erased or rewritten.
  - — CD-RW: The CD-RW is a re-writable version of CD-ROM and can be written the data an unlimited number of times.
  - — Since a reflected laser beam amount of the CD-R/RW is less than the reflected laser beam amount of the conventional CD media, the CD player/changer may not play the CD-R/RW or have the sound jumped.
  - — Since the recording quality of the CD-R/RW vary widely, some CD-R/RW may not be played.

**Recording method**

- There are two methods for recording.
- Classification by recorder
  - — Record the audio data in the audio-CD by audio recorder
    - The price of the audio recorder and original audio-CD includes the copyright fee.
  - — Recorded the audio data in the conventional data-CD by the personal computer
    - The data-CD is cheaper than the audio-CD. But, there is a CD with the low quality.
- Classification by audio data uncompression/compression
  - — Uncompressed audio data
    - The CD-R/RW player can play the uncompressed audio data.
  - — Compressed audio data
    - It is possible to record the large quantity of music in a disc. The sound quality varies depends on the audio data compression format. The compressed audio data can be played on the applicable player only.
  - — Type of compression format:
    - MP3: MPEG Audio Layer 3 — Mazda genie MP3 applicable CD player is available.
    - WMA: Windows Media Audio
    - ATRAG: Adaptive Transform Acoustic Coding

**MP3**

- The following condition should be met in order to record the MP3-formatted data on the MP3 applicable CD player:

| Media | Applicable to the CD-R/RW |
|---|---|
| Logical format | ISO 9660 level 1&2 / Joliet / Romeo |
| Number of directly | 8 directly |
| Number of files | Maximum 255 as a total number of file and folder<br>Maximum 155 for folder |
| ID3 TAG | Applicable to Ver1.1, 2.3 and 2.4 |
| File extension | MP3 |
| Packet writing | Not applicable |
| Bit rate | 8kbps— 320kbps/VBR |
| Sampling rate | 11.025kHz— 48kHz |

# 09-03H SYMPTOM TROUBLESHOOTING [CAR-NAVIGATION SYSTEM]

**CAR-NAVIGATION SYSTEM [CAR-NAVIGATION SYSTEM] . . . . . 09-03H–1**
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Starting Procedure For Diagnostic Function . . . . . 09-03H–12
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## CAR-NAVIGATION SYSTEM[CAR-NAVIGATION SYSTEM]

id0903e8801600

### Troubleshooting Index

- Use the chart below and verify the trouble in order to diagnose the appropriate area.



| No. | Malfunction symptom |
|---|---|
| 1 | Display screen changes to black. |
| 2 | Display screen changes to white. |
| 3 | System does not load map disc. |
| 4 | Vehicle position deviates from the route map. |
| 5 | No voice navigation |
| 6 | Display screen does not change to the night mode.<br>(Front and rear combination lights operate normally.) |
| 7 | Display does not change to the back camera image. |
| 8 | Speech recognition does not start. |

**Quick Diagnostic Chart**

X: Applicable

| Possible factor \ Troubleshooting item | 1 Display screen changes to black. | 2 Display screen changes to white. | 3 System does not load the map disc. | 4 Vehicle position deviates from the route map. | 5 No voice navigation. | 6 Display screen does not change to the night mode. | 7 Display does not change to the back camera image. | 8 Speech recognition does not start. |
|---|---|---|---|---|---|---|---|---|
| Open or short circuit in power supply (B+) wiring harness, or burnt fuse | X | | | | | | | |
| Open or short circuit in power supply (ACC) wiring harness, or burnt fuse | X | | | | | | | |
| Open or short circuit in GND wiring harness | X | | | | | | | |
| Audio unit malfunction | X | X | | | | X | X | |
| Poor connection of audio unit connector, terminal damage | X | | | | | X | X | X |
| Poor connection of car-navigation unit connector, terminal damage | X | | | | X | | | X |
| Car-navigation unit malfunction | | X | X | X | X | X | | X |
| Improper adjustment of screen contrast | | X | | | | | | |
| Map disc malfunction | | | X | | | | | |
| Moisture inside of car-navigation unit | | | X | | | | | |
| Non-designated disc inserted | | | X | | | | | |
| Jammed radio signals from after market equipment | | | | X | | | | |
| Open or short circuit in vehicle speed signal wiring harness | | | | X | | | | |
| Poor connection of GPS antenna connector, terminal damage | | | | X | | | | |
| GPS antenna malfunction | | | | X | | | | |
| Car-navigation control switch malfunction | | | | | | | | |
| Open or short circuit in remote control signal wiring harness | | | | | | | | |
| Poor connection of car-navigation control switch connector, terminal damage | | | | | | | | |
| Improper adjustment of NAVI voice volume | | | | | X | | | |
| Poor connection of driver-side front door speaker connector, terminal damage | | | | | X | | | |
| Driver-side front door speaker malfunction | | | | | X | | | |
| Open or short circuit in driver-side front door speaker wiring harness | | | | | X | | | |
| Improper setting of NAVI map indication | | | | | | X | | |
| Open or short circuit in TNS signal wiring harness | | | | | | X | | |
| Poor connection of audio amplifier connector, terminal damage | | | | | X | | | |
| Back camera malfunction | | | | | | | X | |
| Poor connection of back camera connector, terminal damage | | | | | | | X | |
| Open or short circuit in wiring harness between back camera and rear audio unit | | | | | | | X | |
| Open or short circuit in reverse signal wiring harness | | | | | | | X | |
| Microphone unit | | | | | | | | X |
| Audio control switch malfunction | | | | | | | | X |
| Open or short circuit in wiring harness between audio unit and car-navigation unit | | | | | | | | X |

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## NO.1 DISPLAY SCREEN CHANGES TO BLACK.[CAR-NAVIGATION SYSTEM]

id0903e8811800

| 1 | Display screen changes to black. |
|---|---|
| POSSIBLE CAUSE | • Open or short circuit in car-navigation unit (power supply (B+)) wiring harness<br>• Open or short circuit in car-navigation unit (power supply (ACC)) wiring harness<br>• Open or short circuit in car-navigation unit (GND) wiring harness<br>• Open or short circuit in wiring harness between audio unit and car-navigation unit<br>• Poor connection of rear view monitor control module connector, terminal damage<br>• Open or short circuit in audio unit (power supply (B+)) wiring harness<br>• Open or short circuit in audio unit (power supply (ACC)) wiring harness<br>• Open or short circuit in audio unit (power supply (IG1)) wiring harness<br>• Open or short circuit in audio unit (GND) wiring harness<br>• Open or short circuit in wiring harness between audio unit and rear view monitor<br>• Poor connection of car-navigation unit connector, terminal damage<br>• Poor connection of audio unit connector, terminal damage<br>• Car-navigation unit malfunction<br>• audio unit malfunction |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ACC position.<br>• Does the display screen change from blank to NAVI mode when pressing the joystick of the car-navigation control switch? | Yes | The system is normal.<br><br>**Note**<br>• If the “VOICE” button is pressed for **approx. 2 s or more**, the “DISP OFF” menu appears on the bottom-left side of screen. If “DISP OFF” mode is selected, the audio unit will not display anything. “DISP OFF” mode is cancelled when the ignition switch is turned to the LOCK position or the joystick of the car-navigation control switch is pressed. |
| | | No | Go to the next step. |
| 2 | • Shift the selector lever in R range.<br>• Does it change to rear view screen? | Yes | Go to the next step. |
| | | No | Go to the Step 11. |
| 3 | • Turn the ignition switch to the LOCK position.<br>• Remove the car-navigation unit.<br>• Inspect the car-navigation unit connector (24-pin).<br>• Is the car-navigation unit connector connected securely? | Yes | Go to the next step. |
| | | No | Securely connect the car-navigation unit connector. |
| 4 | • Disconnect the car-navigation unit connector.<br>• Inspect both car-navigation unit connector and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the car-navigation unit connector is wrong:**<br>• Replace the car-navigation unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 5 | • Inspect the voltage between the car-navigation unit wiring harness-side connector (16-pin) terminals B (B+) and A (GND).<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Inspect the suspect wiring harness and repair or replace the wiring harness as necessary. |
| 6 | • Turn the ignition switch to the ACC position.<br>• Inspect the voltage between the car-navigation unit wiring harness-side connector (16-pin) terminals D (ACC) and A (GND).<br>• Is the voltage **B+**? | Yes | Go to the next step. |
| | | No | Inspect the suspect wiring harness and repair or replace the wiring harness as necessary. |
| 7 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Inspect the audio unit connector (24-pin).<br>• Is the audio unit connector connected securely? | Yes | Go to the next step. |
| | | No | Securely connect the audio unit connector. |
| 8 | • Disconnect the audio unit connector (24-pin).<br>• Inspect both audio unit connector and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the audio unit connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 9 | • Inspect the following wiring harnesses between the audio unit and car-navigation unit.<br>— Terminal I (24-pin, UART-2)— terminal N (24-pin, UART-2)<br>— Terminal E (24-pin, UART-1)— terminal P (24-pin, UART-1)<br>• Is there open or short circuit? | Yes | Replace the audio unit, then go to the next step. |
| | | No | Repair or replace the suspect wiring harness. |
| 10 | • Does system work properly? | Yes | Troubleshooting is completed. |
| | | No | Replace the car-navigation unit. |
| 11 | • Turn the ignition switch to the LOCK position.<br>• Remove the rear view monitor.<br>• Inspect the rear view monitor (4-pin).<br>• Is the rear view monitor connector connected securely? | Yes | Go to the next step. |
| | | No | Securely connect the rear view monitor. |
| 12 | • Disconnect the rear view monitor connector (4-pin).<br>• Inspect both rear view monitor connector and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the rear view monitor connector is wrong:**<br>• Replace the rear view monitor.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 13 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Inspect the audio unit connector (4-pin).<br>• Is the audio unit connector connected securely? | Yes | Go to the next step. |
| | | No | Securely connect the audio unit connector. |
| 14 | • Disconnect the audio unit connector (4-pin).<br>• Inspect both audio unit connector and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the audio unit connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 15 | • Verify continuity between rear view monitor and audio unit at harness-side connector.<br>— Rear view monitor terminal A (4-pin, POWER) and audio unit terminal A (4-pin, POWER)<br>— Rear view monitor terminal B (4-pin, P-GND) and audio unit terminal B (4-pin, P-GND)<br>— Rear view monitor terminal C (4-pin, V-GND) and audio unit terminal D (4-pin, V-GND)<br>— Rear view monitor terminal D (4-pin, CONPOSIDE) and audio unit terminal C (4-pin, CONPOSIDE)<br>• Is there any continuity? | Yes | Go to the next step. |
| | | No | Inspect the suspect wiring harness and repair or replace the wiring harness as necessary. |
| 16 | • Does system work properly? | Yes | Troubleshooting is completed. |
| | | No | Replace the car-navigation unit. |

## NO.2 DISPLAY SCREEN CHANGES TO WHITE.[CAR-NAVIGATION SYSTEM]

id0903e8811900

| 2 | **Display screen changes to white.** |
|---|---|
| **POSSIBLE CAUSE** | • Car-navigation unit malfunction<br>• audio unit malfunction<br>• Improper adjustment of the screen contrast |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ACC position.<br>• Shift the selector lever in R range.<br>• Is the rear view screen normal? | Yes | Replace the car-navigation unit. |
| | | No | Go to the next step. |
| 2 | • Does the display screen change to “display quality adjustment” mode when pressing the MODE button for **approx. 2 s or more**? | Yes | Go to the next step. |
| | | No | Replace the audio unit. |
| 3 | • Select “default display” or “display quality adjustment” mode in the NAVI mode.<br>• Press “ENTER” button.<br>• Does system work properly? | Yes | Troubleshooting is completed. |
| | | No | Replace the audio unit, then go to the next step. |

## NO.3 SYSTEM DOES NOT LOAD THE MAP DISC.[CAR-NAVIGATION SYSTEM]

id0903e8812000

| 3 | **System does not load the map disc.** |
|---|---|
| **POSSIBLE CAUSE** | • Car-navigation unit malfunction<br>• Map disc malfunction<br>• Moisture inside of car-navigation unit<br>• Non-designated disc is inserted<br><br>**Note**<br>• If dewdrops are formed inside of the car-navigation unit, the display screen shows the “The disc installed is not a map DVD” message. Remove the map disc, ventilate or remove moisture from the passenger compartment, and then leave it **for approx. 1 h**. The dewdrops will be removed and the car-navigation unit will operate normally.<br>• In case of a dirty/damaged map disc or car-navigation unit malfunction, the display screen will show the “Please insert a map DVD” message for few seconds to 1 min, then change to “The disc installed is not a map DVD” message after the ignition switch is turned to the ACC position.<br>• If a non-designated disc is inserted, the display screen shows the “The disc installed is not a map DVD” message. |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Eject the map disc.<br>• Is the map okay? | Yes | Go to the next step. |
| | | No | Insert a designated disc, then go to the next step. |
| 2 | • Eject the map disc then insert the map disc again.<br>• Does the system load the map disc? | Yes | Trouble shooting is completed. |
| | | No | Go to the next step. |
| 3 | • Eject the map disc and clean the surface of map disc with a soft cloth.<br>• Insert map disc again.<br>• Does the “Cannot Read Disc” error message show up on the screen? | Yes | Trouble shooting is completed. |
| | | No | Replace car-navigation unit and map disc at the same time. (consult distributor) (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |

## NO.4 VEHICLE POSITION DEVIATES FROM THE ROUTE MAP.[CAR-NAVIGATION SYSTEM]

id0903e8812100

| 4 | **Vehicle position deviates from the route map.** |
|---|---|
| **POSSIBLE CAUSE** | • Jammed radio signals from after market equipment (radar, remote engine starter, anti-theft device etc.)<br>• Open or short circuit in the wiring harness (vehicle speed signal related).<br>• Car-navigation unit malfunction.<br>• Poor connection of the GPS antenna connector, terminal damage<br>• GPS antenna malfunction.<br>• Open or short circuit in feeder line between GPS antenna feeder and car-navigation unit. |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is any of the following after-market equipment installed? (Inspect especially near the GPS antenna.)<br>— Radar<br>— Remote engine starter<br>— Anti-theft device.<br>— Other | Yes | Go to the next step. |
| | | No | Go to Step 3. |
| 2 | • Remove the after-market equipment.<br>**Note**<br>• The procedure requires an assistant.<br>• Drive the vehicle without any obstacles.<br>• Does the vehicle indicator follow the steering wheel direction? | Yes | System is normal. The after-market electrical device might be interrupting to the GPS reception. |
| | | No | Go to the next step. |
| 3 | • Position the vehicle without any obstacles and receive GPS for **5 min** at idle.<br>• Does “GPS” show up on the left lower side of the display screen? | Yes | Go to the next step. |
| | | No | Go to Step 8. |
| 4 | **Caution**<br>• **This procedure requires an assistant.**<br>• Start the diagnostic function.<br>• Drive the vehicle.<br>• Check the “Speed” on the diagnosis screen.<br>• Does the “Speed” change according to the vehicle speed?<br>**Note**<br>• If the engine is started after diagnostic functions activated, the diagnostic function mode is reset. | Yes | Go to the next step. |
| | | No | Go to Step 6. |
| 5 | **Caution**<br>• **This procedure requires an assistant.**<br>• Drive the vehicle and turn the steering wheel to the left and/or right.<br>• Does the vehicle indicator follow the steering direction? | Yes | The system is normal.<br>**Note**<br>• The vehicle indicator might be out of position in the following areas:<br>— Parallel road, high-level road, loop road, tower type parking, high-rise buildings lot |
| | | No | Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |
| 6 | • Turn the ignition switch to the LOCK position.<br>• Remove the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.)<br>• Inspect the connection of the car-navigation unit connector (16-pin).<br>• Is the connector securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the car-navigation unit connector. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 7 | • Disconnect the car-navigation unit connector (16-pin).<br>• Inspect both car-navigation unit connector and wiring harness-side connector terminal H for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Inspect for vehicle speed signal input circuit.<br>Repair or replace if necessary. |
| | | No | **If the car-navigation unit connector is wrong:**<br>• Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.)<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 8 | **Note**<br>• If the engine is started after diagnostic functions activated, the diagnostic function mode is reset.<br>• Turn the ignition switch to ON position.<br>• Start the diagnostic function.<br>• Inspect the “GPS antenna” on diagnosis screen.<br>• Is the “OK” indicated? | Yes | Go to the next step. |
| | | No | Go to the Step 6. |
| 9 | • Turn the ignition switch to the LOCK position.<br>• Remove the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/ INSTALLATION.)<br>• Inspect the connection of the car-navigation unit connector and GPS antenna connector.<br>• Is the connector securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the GPS antenna connector. |
| 10 | • Disconnect the GPS antenna connector.<br>• Inspect both GPS antenna connector and car-navigation unit connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |
| | | No | **If the wiring harness-side connector is wrong:**<br>• Repair or replace the suspect wiring harness.<br>**If the car-navigation unit side connector is wrong:**<br>• Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |



### NO.5 NO VOICE NAVIGATION[CAR-NAVIGATION SYSTEM]

id0903e8812300

| 5 | No voice navigation |
|---|---|
| POSSIBLE CAUSE | • Improper adjustment of the NAVI voice volume<br>• Car-navigation unit malfunction<br>• Poor connection of the driver-side front door speaker connector, terminal damage<br>• Driver-side front door speaker malfunction<br>• Poor connection of the car-navigation unit connector, terminal damage<br>• Open or short circuit in driver-side front door speaker wiring harness<br>• Poor connection of the audio amplifier connector, terminal damage |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is the voice navigation volume from “1” ton“7”? | Yes | Go to the next step. |
| | | No | Adjust the volume from “1” to “7”. |
| 2 | • Turn the audio power switch (CD, MD, radio) to ON.<br>• Does the driver-side front door speaker work? | Yes | Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 3 | • Turn the ignition switch to the LOCK position.<br>• Remove the driver-side front door speaker. (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)<br>• Inspect the connection of the driver-side front door speaker connector (2-pin).<br>• Is the connector securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the driver-side front door speaker connector. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 4 | • Disconnect the driver-side front door speaker connector (2-pin).<br>• Inspect both the driver-side front door speaker and wiring harness-side connector for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the driver-side front door speaker side connector is wrong:**<br>• Replace the driver-side front door speaker. (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 5 | • Remove the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/ INSTALLATION.)<br>• Inspect the connection of the car-navigation unit connector (16-pin).<br>• Is the connector securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the car-navigation unit connector. |
| 6 | • Disconnect the car-navigation unit connector (16-pin).<br>• Inspect both the car-navigation unit and wiring harness-side connector terminal F, I and K for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the car-navigation unit side connector is wrong:**<br>• Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.)<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 7 | • Remove the audio amplifier.<br>• Inspect connection of the audio amplifier connector (40-pin).<br>• Is the connector securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the audio amplifier. |
| 8 | • Disconnect the audio amplifier connector (40-pin).<br>• Inspect the audio amplifier and wiring harness connector terminal 3B, 3G and 3H for poor connection (such as damaged/ pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the audio amplifier side connector is wrong:**<br>• Replace the audio amplifier.<br>**Replace the audio amplifier.**<br>• Repair or replace the pins and/or the connector. |
| 9 | • Inspect the continuity between following car-navigation unit and audio amplifier at harness-side connector.<br>— Car-navigation unit terminal F (16-pin, MUTE) and audio amplifier terminal 3B (40-pin, NAVI INT)<br>— Car-navigation unit terminal I (16-pin, PRE SP OUT+) and audio amplifier terminal 3G (40-pin, NAVI-)<br>— Car-navigation unit terminal K (16-pin, PRE SP OUT-) and audio amplifier terminal 3H (40-pin, NAVI+)<br>• Is there continuity? | Yes | Inspect for short circuit in wiring harness.<br>If there is a short circuit, repair or replace the suspect wiring harness.<br>If the wiring harness is okay, go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 10 | • Inspect for continuity between audio amplifier and the driver-side front door speaker.<br>• Is there continuity? | Yes | Inspect for short circuit in the wiring harness.<br>If there is a short circuit, repair or replace the suspect wiring harness.<br>If the wiring harness is okay, go to the next step. |
| | | No | Repair or replace the wiring harness. |
| 11 | • Inspect the driver-side front door speaker. (See 09-20-7 FRONT DOOR SPEAKER INSPECTION.)<br>• Is it normal? | Yes | Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |
| | | No | Replace the driver-side front door speaker. (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.) |

## NO.6 DISPLAY SCREEN DOES NOT CHANGE TO THE NIGHT MODE. (FRONT AND REAR COMBINATION LIGHTS OPERATE NORMALLY.)[CAR-NAVIGATION SYSTEM]

id0903e8812400

| 6 | **Display screen does not change to the night mode. (Front and rear combination lights operate normally.)** |
|---|---|
| **POSSIBLE CAUSE** | • Improper setting of NAVI map indication<br>• Open or short circuit in TNS signal wiring harness (TNS signal related)<br>• audio unit malfunction<br>• Poor connection of the audio unit connector, terminal damage<br>• Car-navigation unit malfunction<br><br>**Note**<br>• The car-navigation control switch is inoperative if the following circuit has malfunction<br>— audio unit connector (24-pin) terminal I (UART-2)— car-navigation unit connector (24-pin) terminal N (UART-2)<br>— audio unit connector (24-pin) terminal E (UART-1)— car-navigation unit connector (24-pin) terminal P (UART-1)<br>• When the ignition switch is turned to OFF, then ACC position, display screen changes to black. |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ON position.<br>• Does the display screen change to the night mode when the light switch is turned to the TNS position, and the dimmer cancel switch is turned to OFF? | Yes | The system is normal. |
| | | No | Go to the next step. |
| 2 | • Press the “MENU” button.<br>• Select “Navigation Set Up”.<br>• Select “User Setting”.<br>• Inspect “MAP Mode”.<br>• Is the “MAP Mode” set to “Auto”?. | Yes | Go to the next step. |
| | | No | System is normal.<br>Set the “MAP Mode” to “Auto”. |
| 3 | • Start diagnostic function is started.<br>• Turn the light switch to TNS position.<br>• Inspect the “TNS” on the diagnosis check screen.<br>• Does the “TNS” indicate “ON”? | Yes | Replace the car-navigation unit. (See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |
| | | No | Go to the next step. |
| 4 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit. (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>• Inspect the connection of the audio unit connector (24-pin).<br>• Is the connector securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the audio unit connector. |
| 5 | • Disconnect the audio unit connector (24-pin).<br>• Inspect both the audio unit and wiring harness-side connector terminal E for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the audio unit side connector is wrong:**<br>• Replace the audio unit. (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 6 | • Inspect the voltage of the audio unit wiring harness-side connector (24-pin) terminal E (TNS signal)<br>• Is voltage **B+** when the light switch is turned to the TNS position? | Yes | Replace the audio unit, then go to the next step. (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.) |
| | | No | Inspect for TNS signal circuit.<br>Repair or replace if necessary. |
| 7 | • Does system work properly? | Yes | Troubleshooting is completed. |
| | | No | Replace the car-navigation unit. |

## NO.7 DISPLAY DOES NOT CHANGE TO THE BACK CAMERA IMAGE.[CAR-NAVIGATION SYSTEM]

id0903e8808300

| 7 | Display does not change to the back camera image |
|---|---|
| POSSIBLE CAUSE | • Back camera malfunction<br>• Poor connection of the back camera connector, terminal damage<br>• audio unit malfunction<br>• Poor connection of the audio unit connector, terminal damage<br>• Open or short circuit in wiring harness between audio unit and rear view monitor<br>• Open or short circuit in reverse signal wiring harness |

**Diagnostic procedure**

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Is the lens of the back camera dirty with garbage, dust? | Yes | Clean the lens of the back camera. |
| | | No | Go to the next step. |
| 2 | • Does the lens of the back camera have a crack and damage? | Yes | Replace the back camera. |
| | | No | Go to the next step. |
| 3 | • Turn the ignition switch to the LOCK position.<br>• Remove the back camera.<br>• Inspect the connection of the back camera connector (4-pin).<br>• Disconnect the back camera connector (4-pin).<br>• Inspect both the back camera and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If poor connection of back camera connector:**<br>• Securely connect the back camera connector.<br>**If the back camera connector is wrong:**<br>• Replace the back camera.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 4 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Inspect the connection of the audio unit connector (4-pin).<br>• Disconnect the audio unit connector (4-pin).<br>• Inspect both the audio unit connector terminal for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If poor connection of audio unit connector:**<br>• Securely connect the audio unit connector.<br>**If the audio unit connector is wrong:**<br>• Replace the audio unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 5 | • Inspect the following wiring harnesses between the audio unit and rear view monitor.<br>— Terminal A (4-pin, POWER)— terminal A (4-pin, POWER)<br>— Terminal B (4-pin, P-GND)— terminal B (4-pin, P-GND)<br>— Terminal C (4-pin, V-GND)— terminal D (4-pin, V-GND)<br>— Terminal D (4-pin, COMPOSITE)— terminal C (4-pin, COMPOSITE)<br>• Is there open or short circuit? | Yes | Go to the next step. |
| | | No | Inspect the suspect wiring harness.<br>Repair or replace if necessary. |
| 6 | • Turn the ignition switch to the LOCK position.<br>• Remove the audio unit.<br>• Disconnect the audio unit connector (24-pin).<br>• Turn the ignition switch to ON.<br>• Shift the selector lever in R range.<br>• Inspect the voltage between the rear view monitor control module terminals M (24-pin, REV) and W (24-pin, GND).<br>• Is the voltage **B+**? | Yes | Replace the back camera, then inspect generating of malfunction symptom.<br>**Even if it exchanges back camera, when a fault phenomenon occurs:**<br>• Replace the audio unit.<br>• Reinspect the malfunction symptom, then repeat from Step 1 if malfunction recurs. |
| | | No | Inspect the suspect wiring harness (reverse signal).<br>Repair or replace if necessary. |

## NO.8 SPEECH RECOGNITION DOES NOT START[CAR-NAVIGATION SYSTEM]

id0903e8812500

| 8 | Speech recognition does not start |
|---|---|
| POSSIBLE CAUSE | • Microphone malfunction<br>• Car-navigation unit malfunction<br>• Audio control switch malfunction<br>• Poor connection of audio unit connector, terminal damage<br>• Poor connection of car-navigation unit connector, terminal damage<br>• Open or short circuit in wiring harness between audio unit and car-navigation unit |

### Diagnostic procedure

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | • Turn the ignition switch to the ACC position.<br>• Start the car-navigation.<br>• Display the map screen.<br>• Press the VOICE button (audio control switch).<br>• Is the speech recognition icon displayed on the screen upper left? | Yes | Go to the next step. |
| | | No | Go to Step 4. |
| 2 | • Start the diagnostic function.<br>• Press the Menu button inside of diagnostic screen.<br>• Select “Navigation check“.<br>• Select “Microphone check“.<br>• After pressing the VOICE button, it utters somewhat greatly toward a microphone.<br>• Inspect the display of “Microphone input level judging”.<br>• Is a judgment “OK” (blue display)? | Yes | The system is normal.<br>**Caution**<br>• **Sound may not be recognized by the influence of the following.**<br>**— Speaker’s utterance method**<br>**— Road noise**<br>**— Other noises** |
| | | No | Replace the microphone, then go to the next step. |
| 3 | • Does the fault phenomenon improve? | Yes | Troubleshooting is completed. |
| | | No | Replace the car-navigation unit. |
| 4 | • Start the diagnostic function.<br>• Inspect the display of “Microphone” in diagnostic screen.<br>• Is it display “OK”? | Yes | Go to the next step. |
| | | No | Go to Step 6. |
| 5 | • The power supply of the audio unit is turned on.<br>• Press the VOICE button (audio control switch).<br>• Does it muffle? | Yes | Replace the car-navigation unit. |
| | | No | Audio control switch system malfunction.<br>Go to the audio symptom troubleshooting. |
| 6 | • Turn the ignition switch to the LOCK position.<br>• Remove the microphone.<br>• Inspect the connection of the microphone connector (6-pin).<br>• Is the connection securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the microphone connector. |
| 7 | • Disconnect the microphone connector (6-pin).<br>• Inspect both microphone connector and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the microphone connector is wrong:**<br>• Replace the microphone.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |
| 8 | • Remove the car-navigation unit.<br>• Inspect the connection of the car-navigation unit connector (6-pin).<br>• Is the connection securely connected? | Yes | Go to the next step. |
| | | No | Securely connect the car-navigation unit connector. |
| 9 | • Disconnect the car-navigation unit connector (6-pin).<br>• Inspect both car-navigation unit connector and wiring harness-side connector for poor connection (such as damaged/pulled-out pins, corrosion).<br>• Are all the pins normal? | Yes | Go to the next step. |
| | | No | **If the car-navigation unit connector is wrong:**<br>• Replace the car-navigation unit.<br>**If the wiring harness-side connector is wrong:**<br>• Repair or replace the pins and/or the connector. |

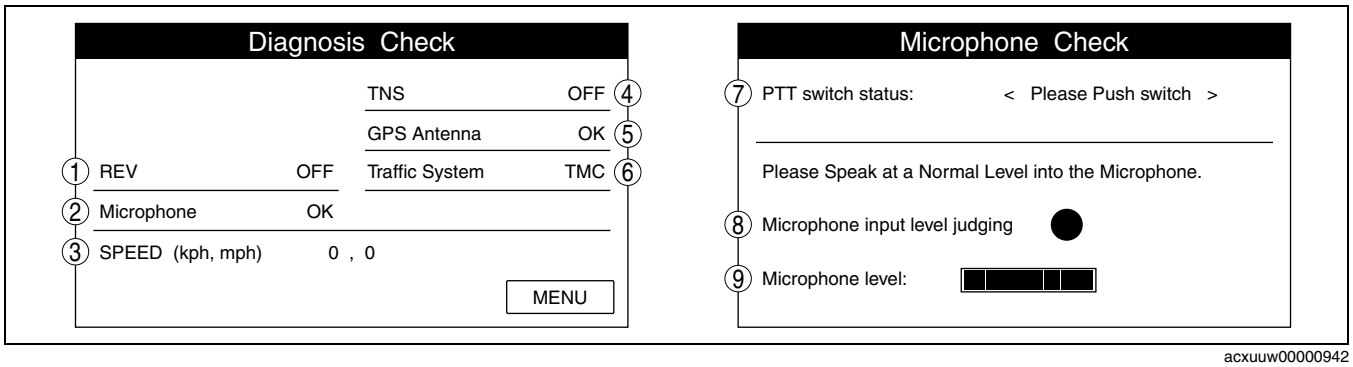
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 10 | • Inspect the following wiring harnesses between the microphone and car-navigation unit.<br>— Terminal A (6-pin, MIC+)— terminal A (6-pin, MIC+)<br>— Terminal B (6-pin, MIC-)— terminal B (6-pin, MIC-)<br>— Terminal C (6-pin, MIC B+)— terminal C (6-pin, MIC B+)<br>— Terminal D (6-pin, GND)— terminal D (6-pin, GND)<br>— Terminal E (6-pin, MIC SENSE)— terminal E (6-pin, MIC SENSE)<br>• Is there open or short circuit? | Yes | Replace the microphone, then go to the next step. |
| | | No | Inspect the suspect wiring harness.<br>Repair or replace if necessary. |
| 11 | • Does the fault phenomenon improve? | Yes | Troubleshooting is completed. |
| | | No | Replace the car-navigation unit. |

## REFERENCE INFORMATION[CAR-NAVIGATION SYSTEM]

id0903e8802600

### Starting Procedure For Diagnostic Function

1. Turn the ignition switch to the ACC or ON position.
2. Press the MENU button.
3. Select “Navigation Set Up”.
4. Select “Calibration”.
5. Select “Map Version”.
6. Press the joystick up **two times**, then down **two times**.
7. “Diagnosis Check” is displayed on the screen.
8. Select the “Diagnosis Check”.

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| No. | Display item | Description |
|---|---|---|
| 1 | REV | Indicate Reverse signal state.<br>• ON: Reverse<br>• OFF: Others |
| 2 | Microphone | Indicate the connection state of a microphone.<br>• OK: Connect<br>• NCON: Disconnect |
| 3 | Speed* | Indicate the present vehicle speed by kph/mph (a maximum of 3 digits). |
| 4 | TNS* | Indicate TNS signal state.<br>• ON: Turn TNS ON<br>• OFF: Turn TNS OFF |
| 5 | GPS Antenna* | Indicate the connection state of a GPS antenna.<br>• OK: Connect<br>• NCON: Disconnect |
| 6 | Traffic system | Indicate the RDS-TMC system availability on the vehicle.<br>• TMC: Equip |
| 7 | PTT switch status | Indicate the state of a VOICE button.<br>• <OK>: Press the button (Keep the state until the screen is changed.)<br>• <Please Push Switch>: Other than above condition |

| No. | Display item | Description |
|---|---|---|
| 8 | Microphone input level judging | Indicate the test result.<br>• Blue indicator: The sound is inputted from the microphone properly.<br>• Gray indicator: The sound is inputted from the microphone improperly. |
| 9 | Microphone level | Indicate the input level of microphone by bar graph. |

* : It is used for symptom troubleshooting. (Troubleshooting index No. 5 and No. 8)

**Finishing Procedure For Diagnostic Function**

1. Turn the ignition switch to the LOCK position.
2. Turn the ignition switch to the ACC or ON position.
3. Return to the normal screen.

# 09-10 BODY PANELS

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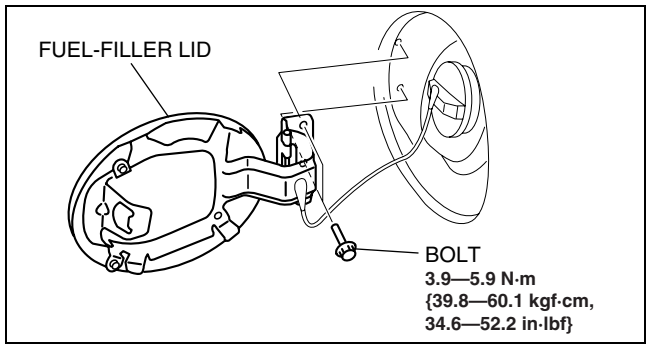
## FUEL-FILLER LID REMOVAL/INSTALLATION

id091000800100

1. Remove the bolts..
2. Remove the fuel-filler lid
3. Install in the reverse order of removal.
4. Adjust the fuel-filler lid. (See 09-10-1 FUEL-FILLER LID ADJUSTMENT.)

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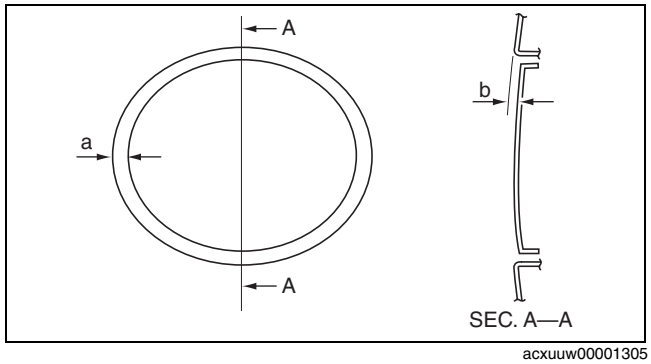
## FUEL-FILLER LID ADJUSTMENT

id091000800200

1. Measure the gap and height difference between the fuel-filler lid and the body.
2. Loosen the fuel-filler lid installation bolts and adjust the fuel-filler lid.

   **Clearance**
   **a: 1.7— 3.7 mm {0.07— 0.14 in}**
   **b: -0.5— 1.5 mm {-0.01— 0.05 in}**

3. Tighten the bolts.

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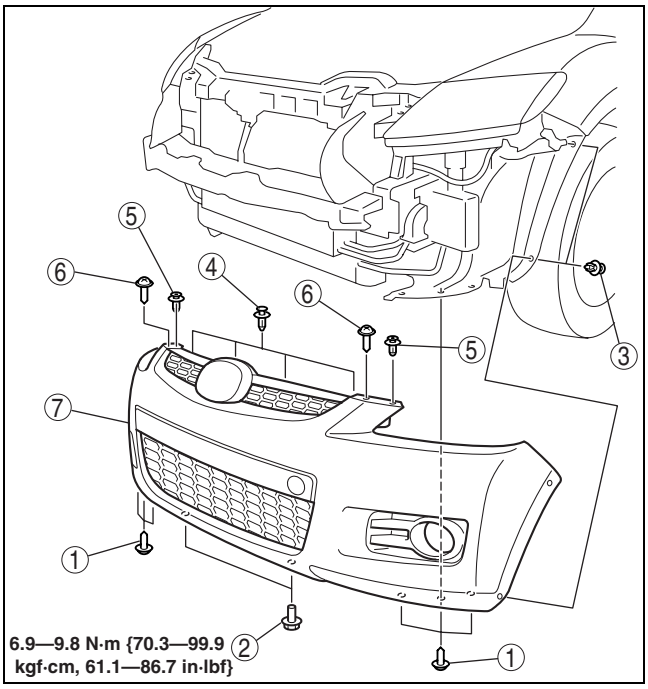
## FRONT BUMPER REMOVAL/INSTALLATION

id091000800300

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw A |
| 2 | Bolt |
| 3 | Fastener A |
| 4 | Fastener B |
| 5 | Fastener C |
| 6 | Screw B |
| 7 | Front bumper<br>(See 09-10-2 Front Bumper Removal Note)<br>(See 09-10-2 Front Bumper Installation Note) |

3. Disconnect the front fog light connector. (Vehicles with front fog lights)
4. Install in the reverse order of removal.
5. Adjust the front fog light aiming for vehicles with front fog lights. (See 09-18-9 FRONT FOG LIGHT AIMING.)

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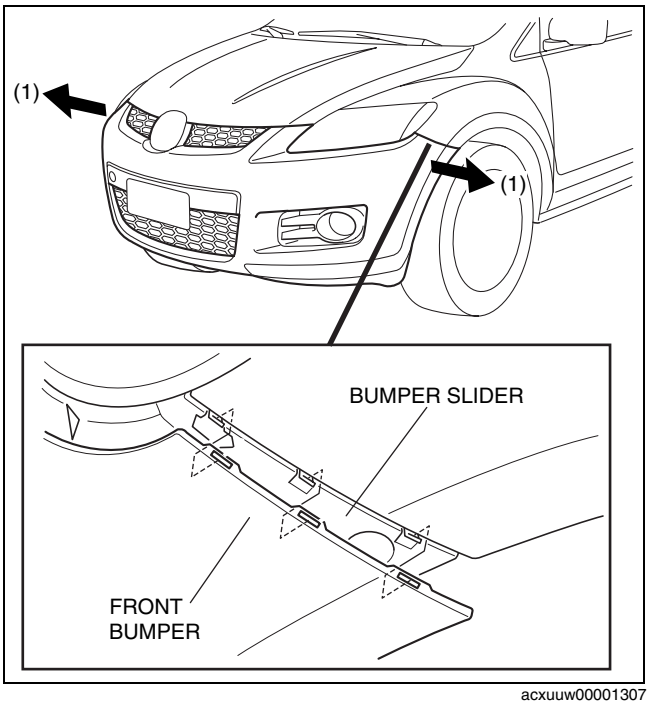
### Front Bumper Removal Note

1. Pull the front bumper ends (wheel arch) outward (1) to disengage from the bumper slider.

**Caution**

- **When disengaging the front bumper from the bumper slider, the front bumper could fall and be dameged. Secure the front bumper so that it does not fall.**

2. Remove the front bumper from the body.

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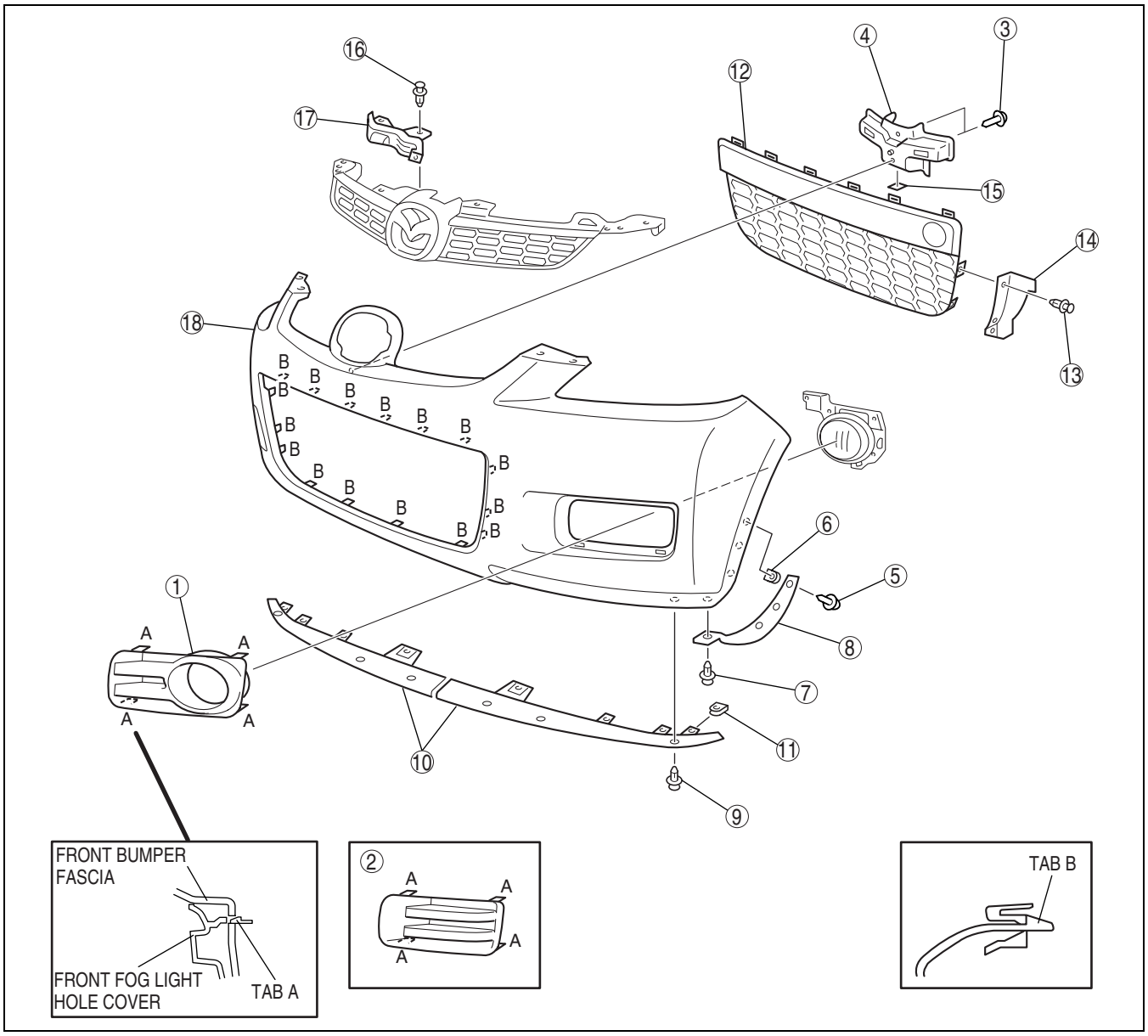
### Front Bumper Installation Note

1. Spread the front bumper ends apart.
2. Assemble the front bumper to the body.
3. Press the front bumper connecting area into the body to engage with the bumper slider.

## FRONT BUMPER DISASSEMBLY/ASSEMBLY

id091000800400

1. Remove the front fog light. (Vehicles with front fog lights) (See 09-18-9 FRONT FOG LIGHT REMOVAL/INSTALLATION.)
2. Remove the radiator grille. (See 09-16-11 RADIATOR GRILLE REMOVAL/INSTALLATION.)
3. Disassemble in the order indicated in the table.

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| | |
|---|---|
| 1 | Front fog light hole cover (Vehicles with front fog lights) |
| 2 | Front fog light hole cover (Vehicles without front fog lights) |
| 3 | Screw A |
| 4 | Front bumper retainer |
| 5 | Screw B |
| 6 | Clip nut A |
| 7 | Fastener A |
| 8 | Screw C |
| 9 | Fastener B |

| | |
|---|---|
| 10 | Front airdam skirt |
| 11 | Clip nut B |
| 12 | Front bumper mesh |
| 13 | Seal plate |
| 14 | Fastener C |
| 15 | Seal rubber |
| 16 | Screw D |
| 17 | Air duct |
| 18 | Furnt bumper fascia |

4. Assemble in the reverse order of disassembly.

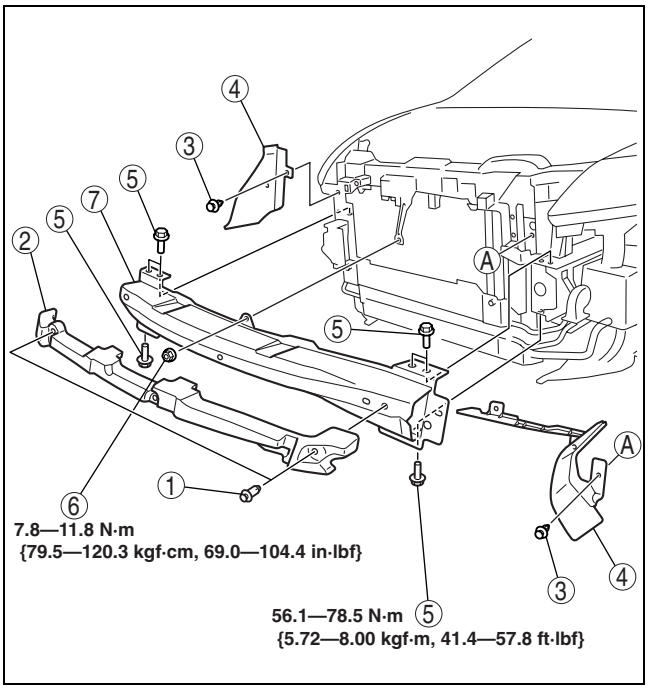
## FRONT BUMPER REINFORCEMENT REMOVAL/INSTALLATION

id091000800600

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Fastener A |
| 2 | Front energy-absorbing foam |
| 3 | Fastener B |
| 4 | Seal plate |
| 5 | Bolt A |
| 6 | Bolt B |
| 7 | Front bumper reinforcement |

4. Install in the reverse order of removal.

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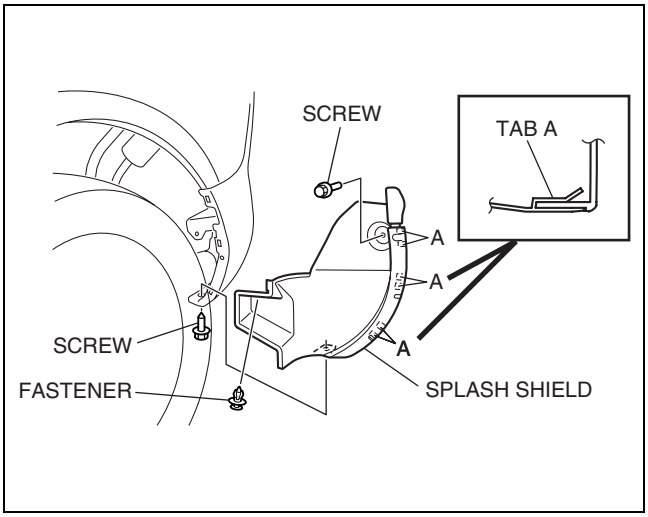
## REAR BUMPER REMOVAL/INSTALLATION

id091000800700

1. Disconnect the negative battery cable.
2. Remove the rear combination light. (See 09-18-11 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)
3. Remove the screw and fastener.
4. Splash shield, detach tabs A, and then remove the splash shield.

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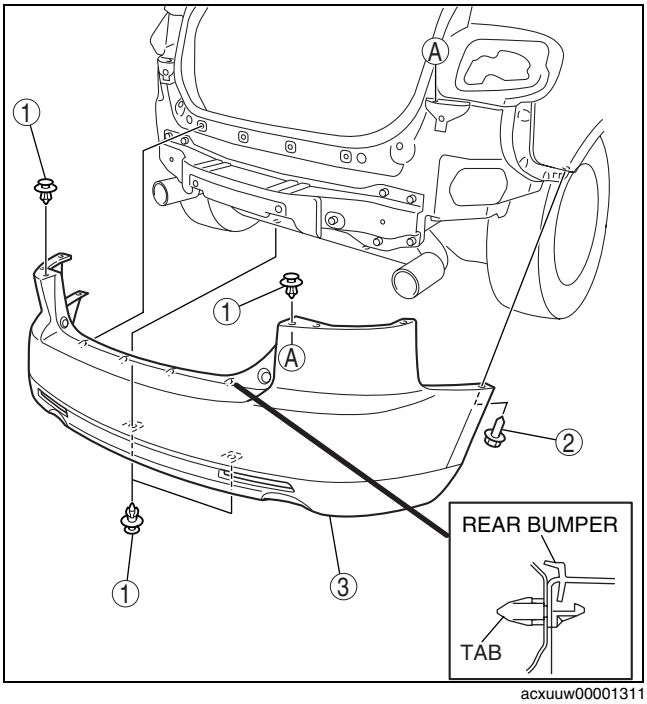
5. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Fastener |
| 2 | Screw |
| 3 | Rear bumper<br>(See 09-10-5 Rear Bumper Removal Note)<br>(See 09-10-5 Rear Bumper Installation Note) |

6. Install in the reverse order of removal.

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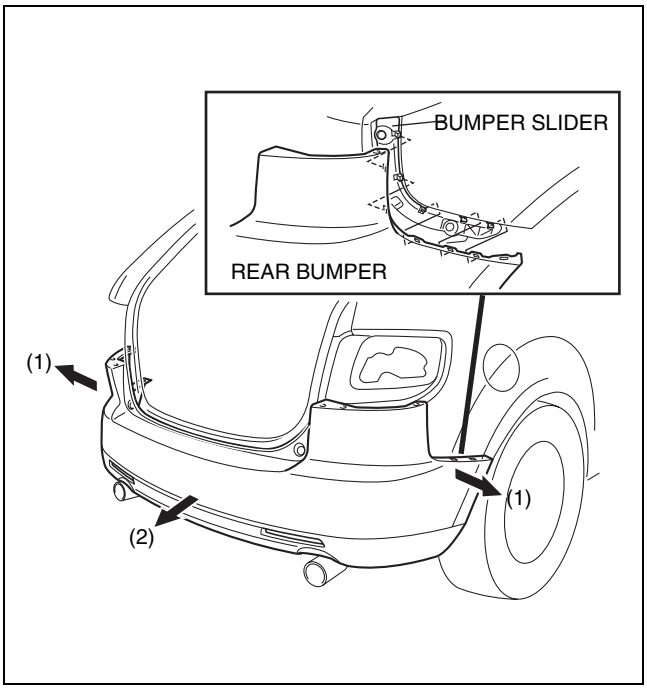
**Rear Bumper Removal Note**

1. Pull the rear bumper ends (wheel arch) outward (1) to disengage from the bumper slider.

**Caution**

- **When disengaging the rear bumper from the bumper slider, the rear bumper could fall and be damaged. Secure the rear bumper so that it does not fall.**

2. Remove the rear bumper (2).

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**Rear Bumper Installation Note**

1. Spread the rear bumper ends apart.
2. Assemble the rear bumper to the body.
3. Press the rear bumper connecting area into the body to engage with the bumper slider.

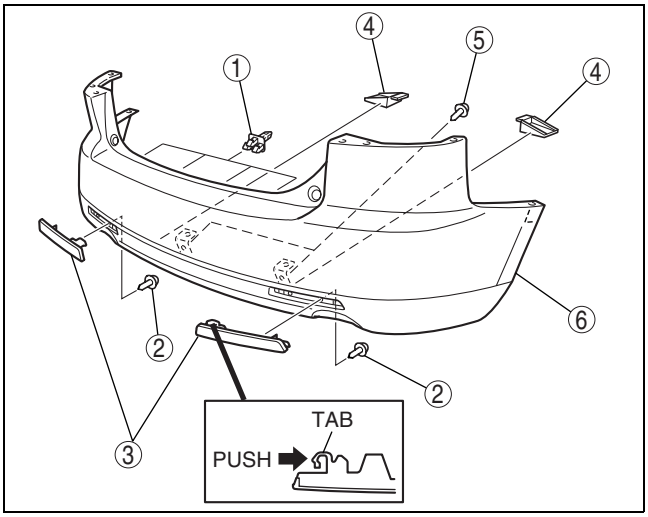
## REAR BUMPER DISASSEMBLY/ASSEMBLY

id091000800800

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Locator pin |
| 2 | Screw A |
| 3 | Rear reflector<br>(See 09-10-6 Reflector Removal Note) |
| 4 | Bumper guard |
| 5 | Screw B |
| 6 | Rear bumper fascia |

2. Assemble in the reverse order of disassembly.

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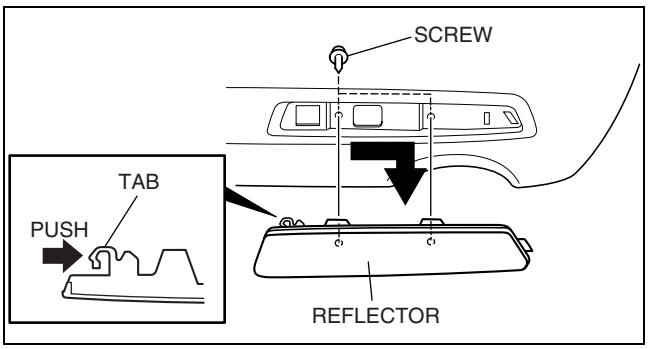
### Reflector Removal Note

1. Remove the screw.
2. Pull off the reflector from the rear bumper in the direction shown by the arrow.

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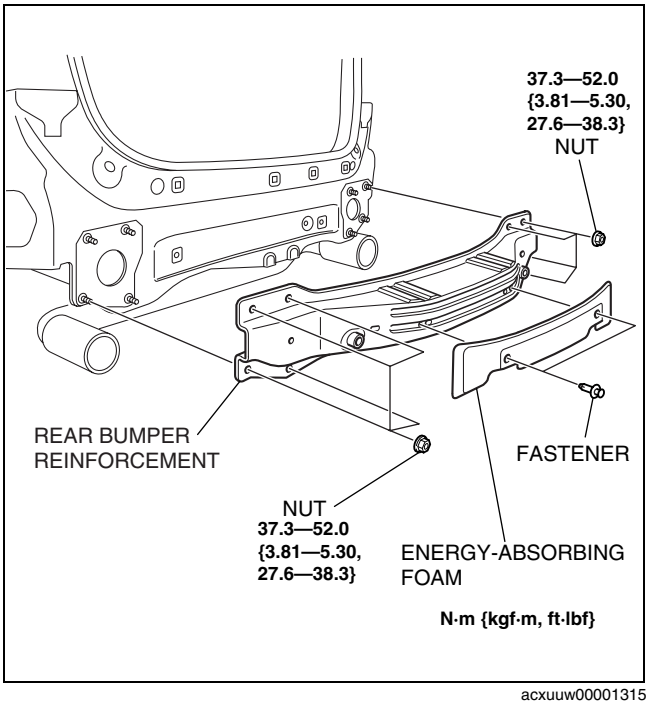
## REAR BUMPER REINFORCEMENT REMOVAL/INSTALLATION

id091000800900

1. Disconnect the negative battery cable.
2. Remove the rear combination light. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
3. Remove the rear bumper. (See 09-10-4 REAR BUMPER REMOVAL/INSTALLATION.)
4. Remove the fasteners, then remove the energy-absorbing foam.
5. Remove the nuts, then remove the rear bumper reinforcement.
6. Install in the reverse order of removal.

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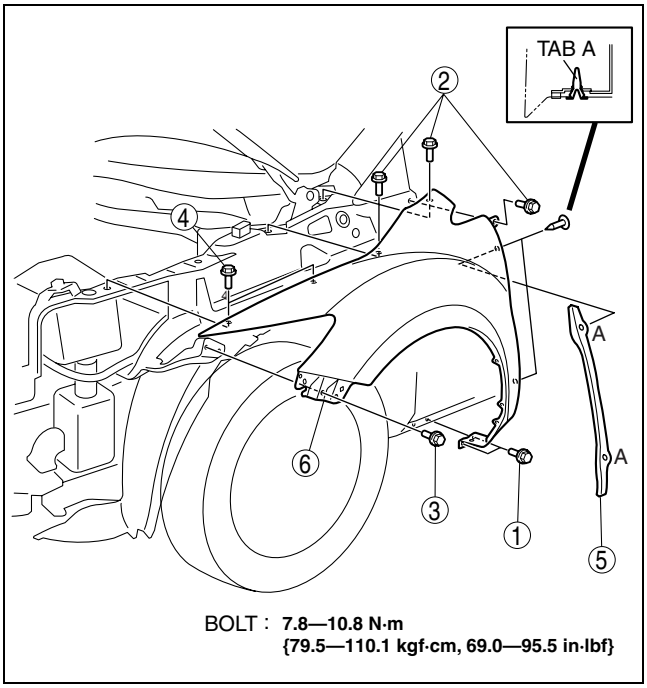
## FRONT FENDER PANEL REMOVAL/INSTALLATION

id091000801000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Windshield wiper arm and blade. (See09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION)
   (2) Cowl grill. (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION)
   (3) Front bumper. (See09-10-2 FRONT BUMPER REMOVAL/INSTALLATION)
   (4) Front combination lights. (See09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION)
   (5) Side step molding. (See09-16-14 SIDE STEP MOLDING REMOVAL)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt A |
| 2 | Bolt B |
| 3 | Bolt C |
| 4 | Bolt D |
| 5 | Seal platel |
| 6 | Front fender pane |

4. Install in the reverse order of removal.




BOLT : **7.8—10.8 N·m {79.5—110.1 kgf·cm, 69.0—95.5 in·lbf}**

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## LOCATION INDEX

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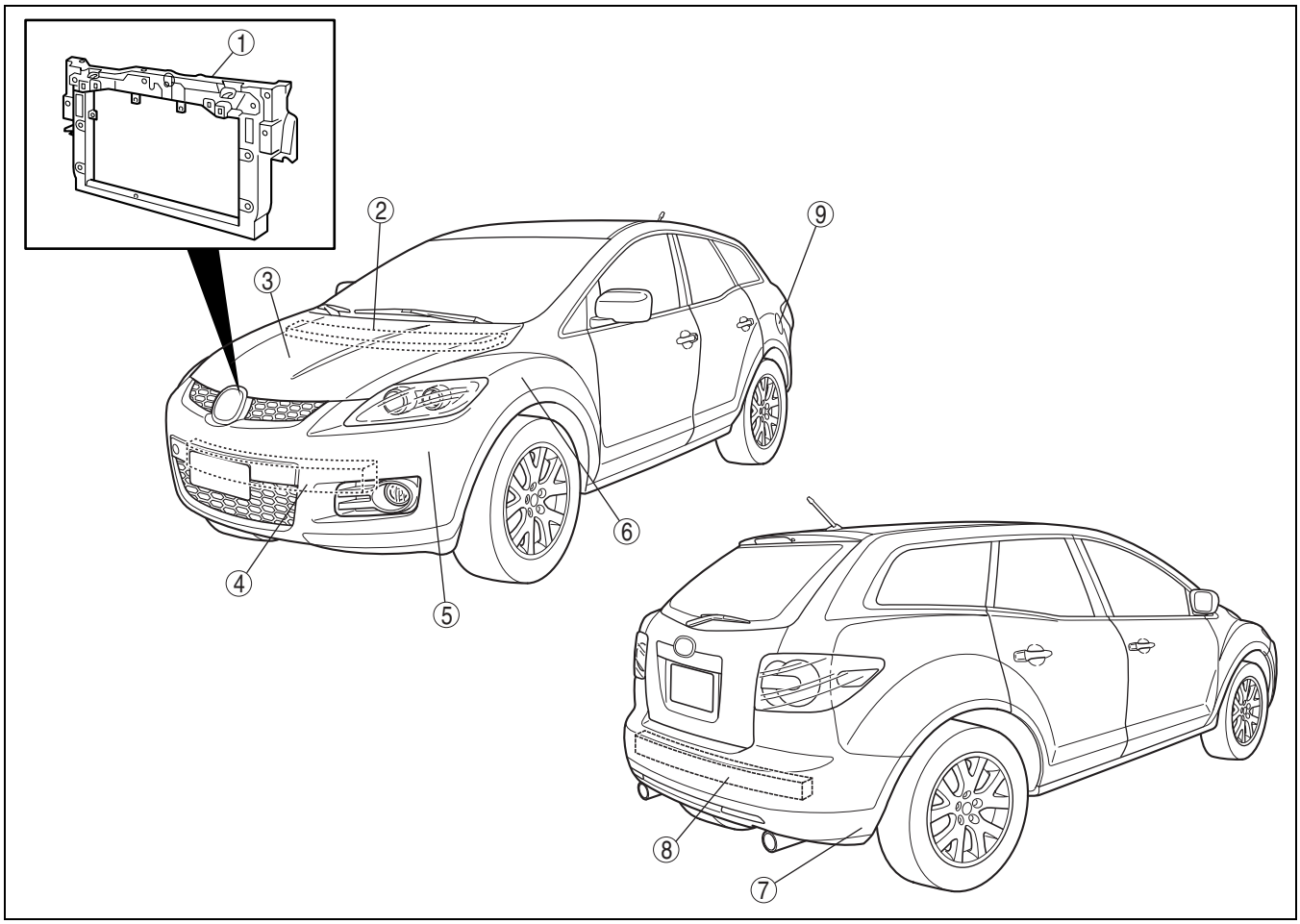


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| | |
|---|---|
| 1 | Shroud panel<br>(See 09-10-12 SHROUD PANEL REMOVAL/ INSTALLATION.) |
| 2 | Cowl panel<br>(See 09-10-13 COWL PANEL REMOVAL/ INSTALLATION.) |
| 3 | Hood<br>(See 09-10-9 HOOD REMOVAL/INSTALLATION.)<br>(See 09-10-10 HOOD ADJUSTMENT.) |
| 4 | Front bumper reinforcement<br>(See 09-10-4 FRONT BUMPER REINFORCEMENT REMOVAL/INSTALLATION) |
| 5 | Front bumper<br>(See 09-10-2 FRONT BUMPER REMOVAL/ INSTALLATION.)<br>(See 09-10-3 FRONT BUMPER DISASSEMBLY/ ASSEMBLY.) |

| | |
|---|---|
| 6 | Front fender panel<br>(See 09-10-7 FRONT FENDER PANEL REMOVAL/ INSTALLATION.) |
| 7 | Rear bumper<br>(See 09-10-4 REAR BUMPER REMOVAL/ INSTALLATION.)<br>(See 09-10-6 REAR BUMPER DISASSEMBLY/ ASSEMBLY.) |
| 8 | Rear bumper reinforcement<br>(See 09-10-6 REAR BUMPER REINFORCEMENT REMOVAL/INSTALLATION.) |
| 9 | Fuel-filler lid<br>(See 09-10-1 FUEL-FILLER LID REMOVAL/ INSTALLATION.)<br>(See 09-10-1 FUEL-FILLER LID ADJUSTMENT.) |

## HOOD REMOVAL/INSTALLATION

id091000801200

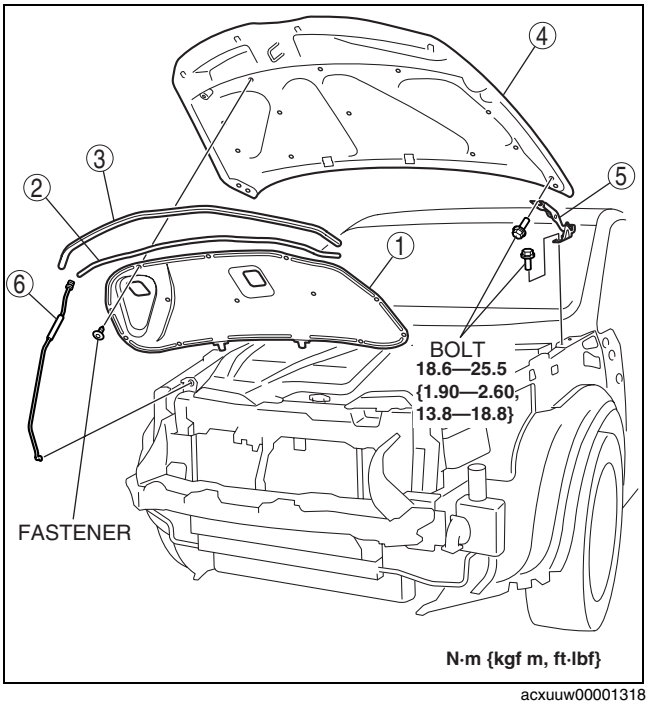
**Warning**

- **Removing the hood without supporting it could cause the hood to fall and cause serious injury. Always perform the procedure with at least another person to prevent the hood from falling.**

1. Disconnect the negative battery cable.
2. To remove the hood hinges, remove the following parts:
   (1) Windshield wiper arm and blade. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION)
   (2) Cowl grill. (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION)
   (3) Front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION)
   (4) Front combination lights. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION)
   (5) Side step molding. (See 09-16-14 SIDE STEP MOLDING REMOVAL)
   (6) Front fender panel. (See 09-10-7 FRONT FENDER PANEL REMOVAL/INSTALLATION)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Hood insulator |
| 2 | Shroud seal weatherstrip |
| 3 | Parting seal weatherstrip |
| 4 | Hood |
| 5 | Hood hinge |
| 6 | Hood stay |

4. Install in the reverse order of removal.
5. Adjust the hood. (See 09-10-10 HOOD ADJUSTMENT.)

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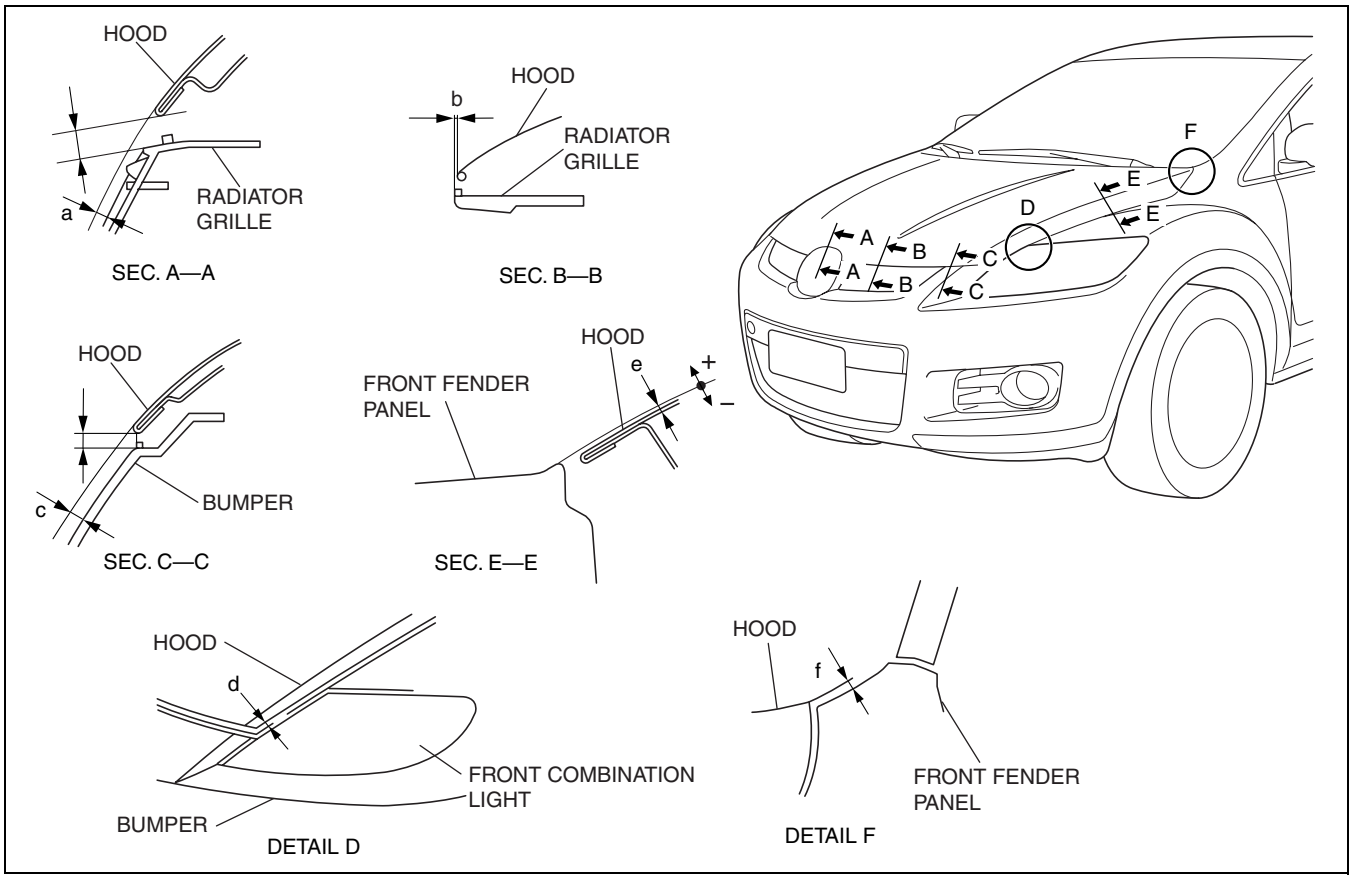
## HOOD ADJUSTMENT

id091000801400

### Gap Adjustment

1. Measure the gap between the hood and body.

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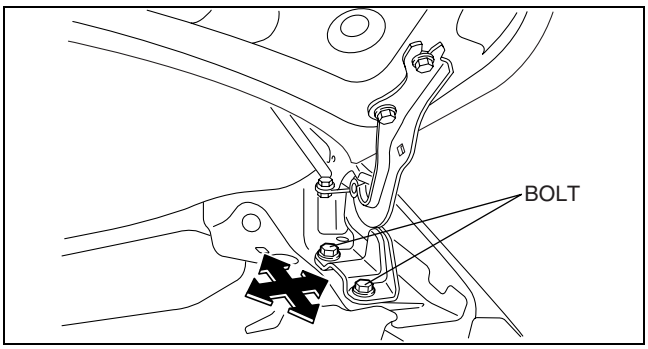
**Standard clearance**

**a: 0.0— 3.6 mm {0.00— 0.14 in}**
**b: -1.5— 2.5 mm {-0.05— 0.09 in}**
**c: -2.0— 2.2 mm {-0.07— 0.07 in}**
**d: 0.6— 2.0 mm {0.02— 0.07 in}**
**e: -1.0— 1.0 mm {-0.03— 0.03 in}**
**f: -1.5— 1.5 mm {-0.05— 0.054 in}**

2. Disconnect the negative battery cable.
3. Remove the following parts:
   (1) Windshield wiper arm and blade. (See09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/ INSTALLATION)
   (2) Cowl grill. (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION)
4. Loosen the hood hinge installation bolts and adjust the hood.
5. Tighten the bolts.

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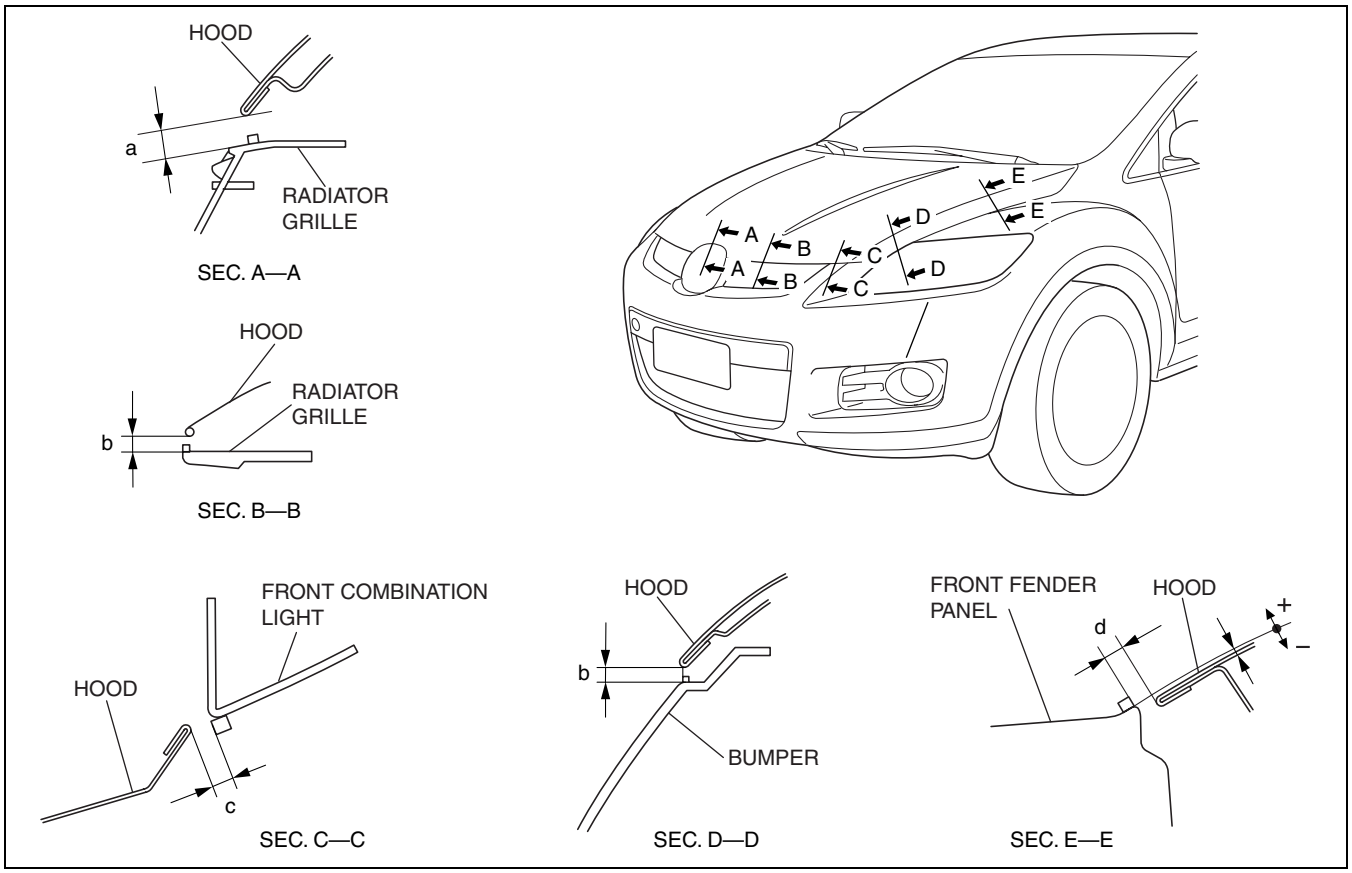
**Height Adjustment**

1. Measure the height difference between the hood and body.

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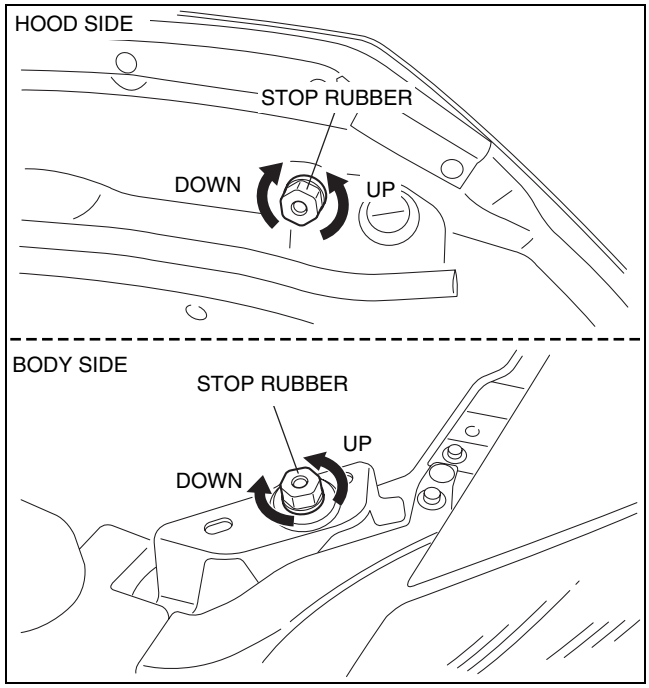
**Clearance**

**a: 2.8— 5.8 mm {0.11— 0.22 in}**
**b: 3.0— 6.0 mm {0.12— 0.23 in}**
**c: 2.0— 5.5 mm {0.07— 0.21 in}**
**d: -1.2— 1.2 mm {-0.04— 0.04 in}**

2. Turn the stop rubber to adjust.

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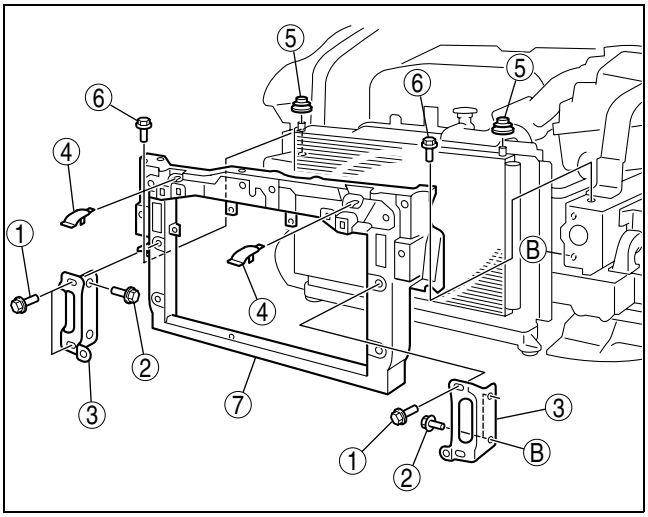
## SHROUD PANEL REMOVAL/INSTALLATION

id091000801900

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front bumper. (See09-10-2 FRONT BUMPER REMOVAL/INSTALLATION)
   (2) Front combination lights. (See09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION)
   (3) Front bumper reinforcement. (See09-10-4 FRONT BUMPER REINFORCEMENT REMOVAL/INSTALLATION)
   (4) Hood latch. (See09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION)
   (5) Hood stay. (See09-10-9 HOOD REMOVAL/INSTALLATION)
3. Put the oil cooler aside.
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt A |
| 2 | Bolt B |
| 3 | Bumper bracket |
| 4 | Upper mount rubber bracket |
| 5 | Upper mount rubber |
| 6 | Bolt C |
| 7 | Shroud panel |

5. Install in the reverse order of removal.

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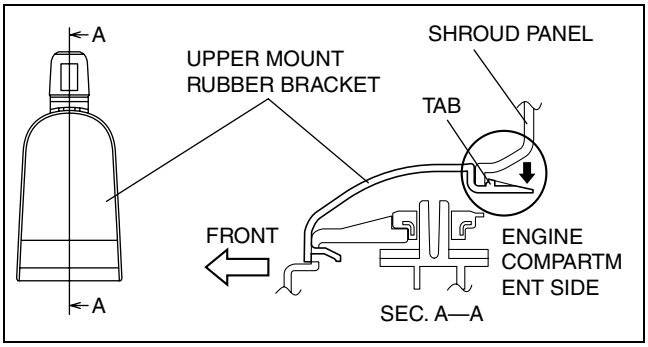
### Upper Mount Rubber Bracket

1. Remove the upper mount rubber bracket while pressing down the upper mount rubber bracket tab in the direction of the arrow.

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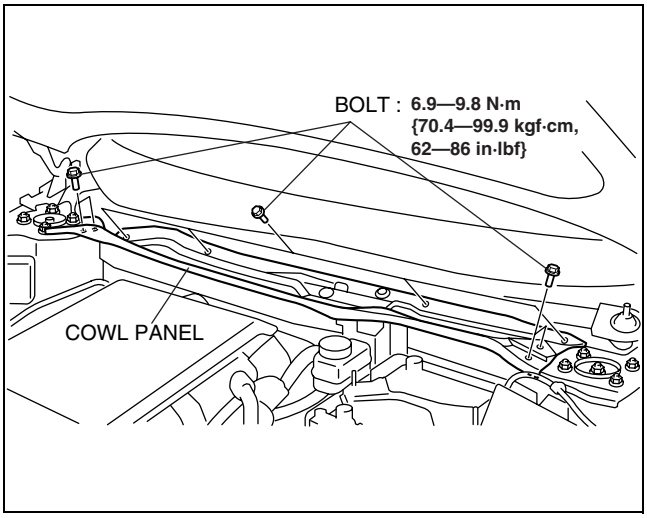
## COWL PANEL REMOVAL/INSTALLATION

id091000802000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Windshield wiper arm and blade. (See09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION)
   (2) Cowl grill. (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION)
3. Remove the bolts, then remove the cowl panel.
4. Install in the reverse order of removal.

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# 09-11 DOORS AND LIFTGATE

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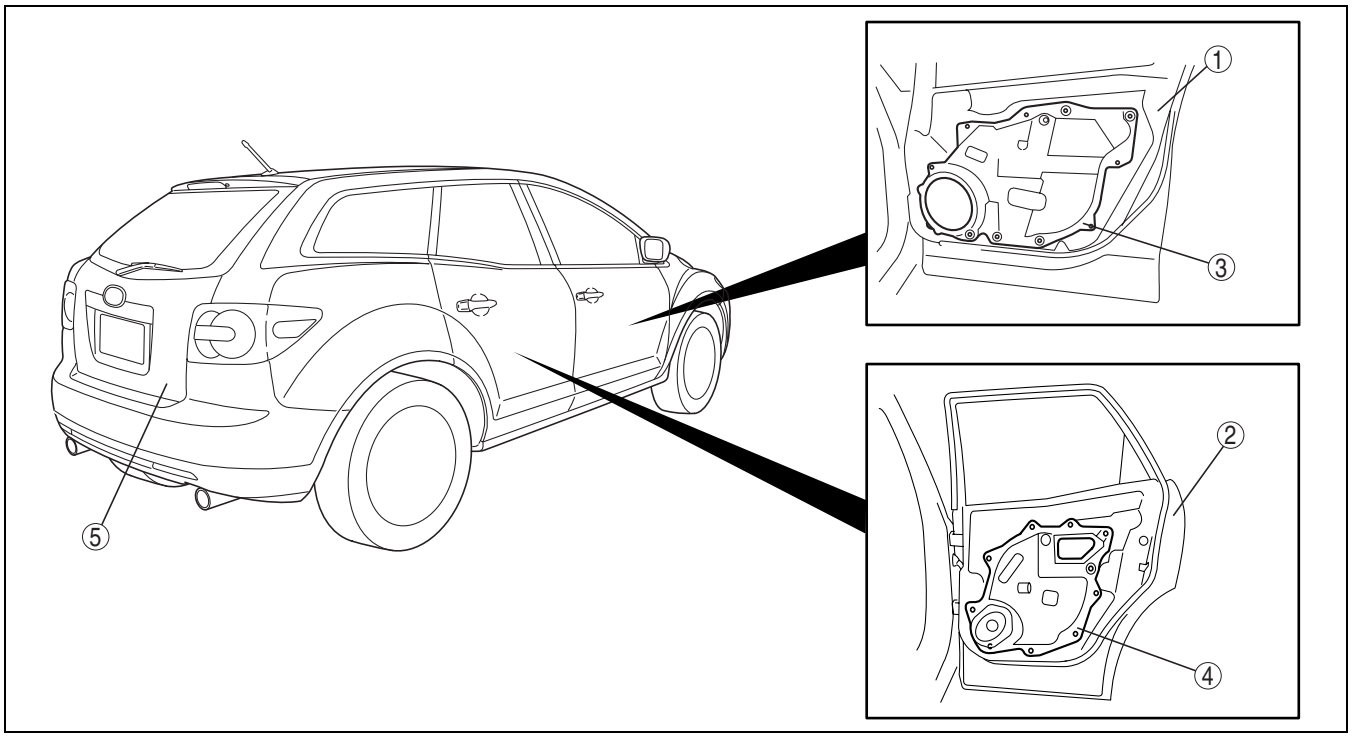
id091100800100

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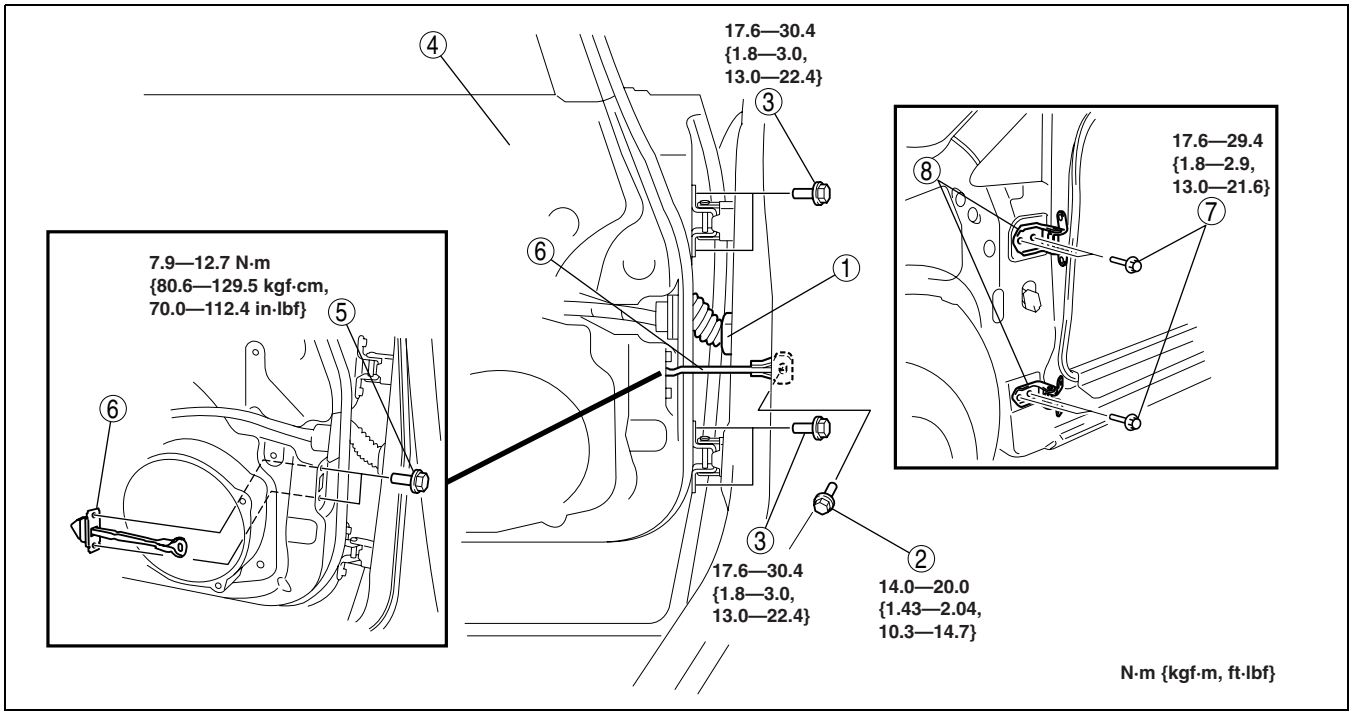
| | |
|---|---|
| 1 | Front door<br>(See 09-11-2 FRONT DOOR REMOVAL/ INSTALLATION.)<br>(See 09-11-3 DOOR ADJUSTMENT.) |
| 2 | Rear door<br>(See 09-11-3 REAR DOOR REMOVAL/ INSTALLATION.)<br>(See 09-11-3 DOOR ADJUSTMENT.) |

| | |
|---|---|
| 3 | Front door unit<br>(See 09-11-4 FRONT DOOR UNIT REMOVAL/ INSTALLATION.) |
| 4 | Rear door unit<br>(See 09-11-4 FRONT DOOR UNIT REMOVAL/ INSTALLATION.) |
| 5 | Liftgate<br>(See 09-11-5 LIFTGATE REMOVAL/ INSTALLATION.)<br>(See 09-11-6 LIFTGATE ADJUSTMENT.) |

## FRONT DOOR REMOVAL/INSTALLATION

id091100800200

1. Disconnect the negative battery cable.
2. To remove the checker, remove the following parts:
   (1) Inner garnish (See09-17-20 INNER GARNISH REMOVAL/INSTALLATION)
   (2) Front door trim (See09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION)
   (3) Front door speaker (See09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION)
3. To remove the front door hinges, remove the following parts:
   (1) Windshield wiper arm and blade (See09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION)
   (2) Cowl grill (See09-16-11 COWL GRILLE REMOVAL/INSTALLATION)
   (3) Front bumper (See09-10-2 FRONT BUMPER REMOVAL/INSTALLATION)
   (4) Front combination lights (See09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION)
   (5) Side step molding (See09-16-14 SIDE STEP MOLDING REMOVAL)
   (6) Front fender panel (See09-10-7 FRONT FENDER PANEL REMOVAL/INSTALLATION)
4. Remove in the order indicated in the table.

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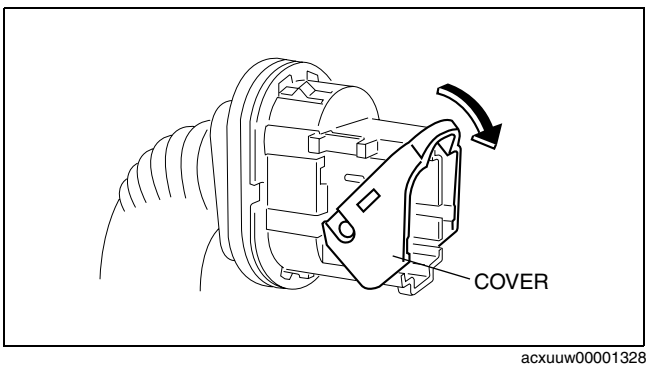
| | |
|---|---|
| 1 | Connector<br>(See 09-11-2 Connector Removal Note.) |
| 2 | Bolt A |
| 3 | Bolt B |
| 4 | Front door |

| | |
|---|---|
| 5 | Bolt C |
| 6 | Checker |
| 7 | Bolt D |
| 8 | Front door hinge |

5. Install in the reverse order of removal.
6. Adjust the front door. (See 09-11-3 DOOR ADJUSTMENT.)

**Connector Removal Note**

1. Pull down the cover in the direction of the arrow and disconnect the connector.

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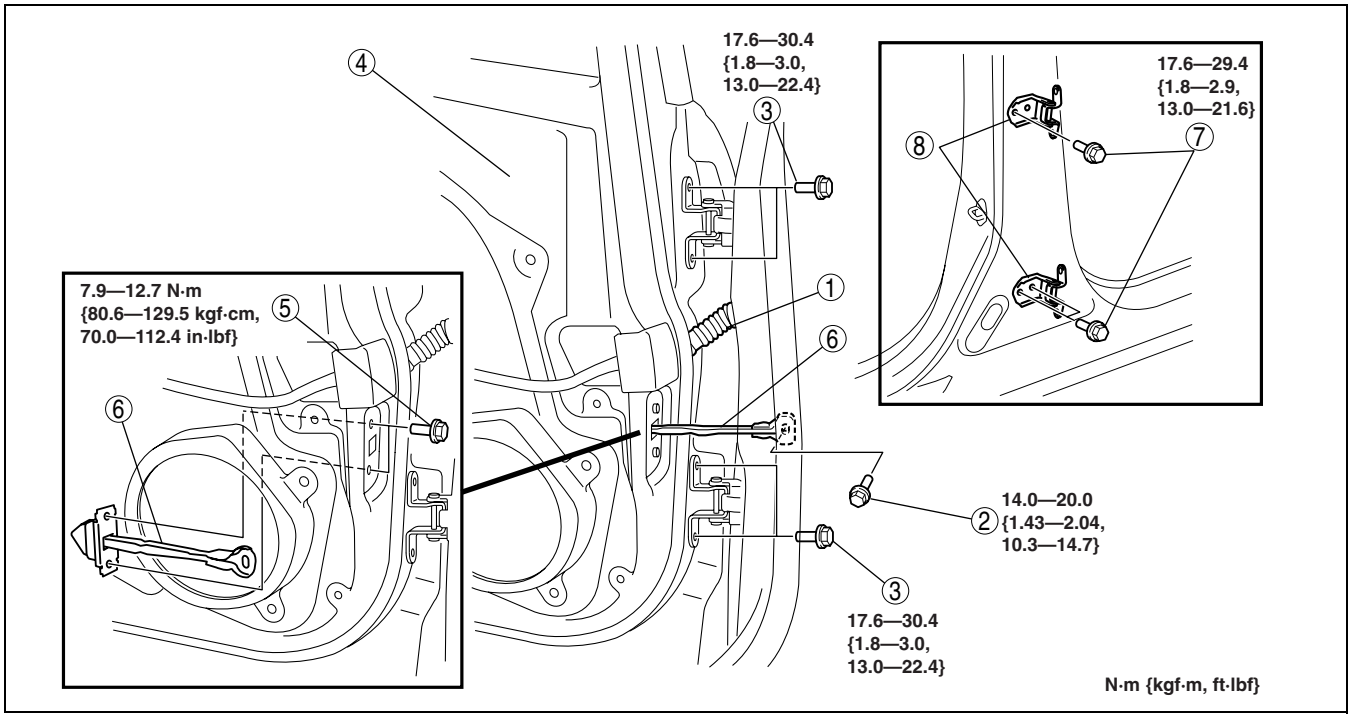
## REAR DOOR REMOVAL/INSTALLATION

id091100800300

1. To remove the checker, remove the following parts:
   (1) Inner garnish (See09-17-20 INNER GARNISH REMOVAL/INSTALLATION)
   (2) Rear door trim (See09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION)
   (3) Rear door speaker (See09-20-7 REAR DOOR SPEAKER REMOVAL/INSTALLATION)
2. Remove in the order indicated in the table.

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| | |
|---|---|
| 1 | Connector |
| 2 | Bolt A |
| 3 | Bolt B |
| 4 | Rear door |

| | |
|---|---|
| 5 | Bolt C |
| 6 | Checker |
| 7 | Bolt D |
| 8 | Rear door hinge |

3. Install in the reverse order of removal.
4. Adjust the front door. (See 09-11-3 DOOR ADJUSTMENT.)

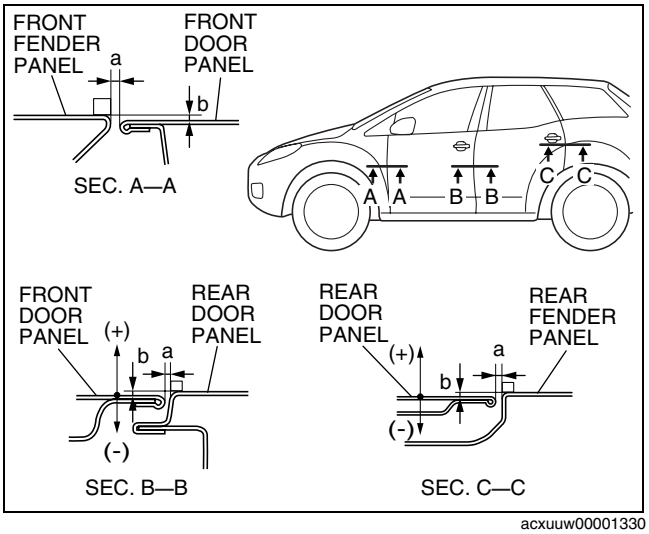
## DOOR ADJUSTMENT

id091100800400

1. Loosen the door hinge installation bolts.
2. Adjust the gap and height difference to the standard range by moving the door back and forth, left and right.

   **Clearance**
   **a: 2.5— 4.5 mm {0.10— 0.17 in}**
   **d: -1.0— 1.0 mm {-0.03— 0.03 in}**

3. Tighten the bolts or screws.
4. If the front door and rear door dose not open/ close smoothly, loosen the door

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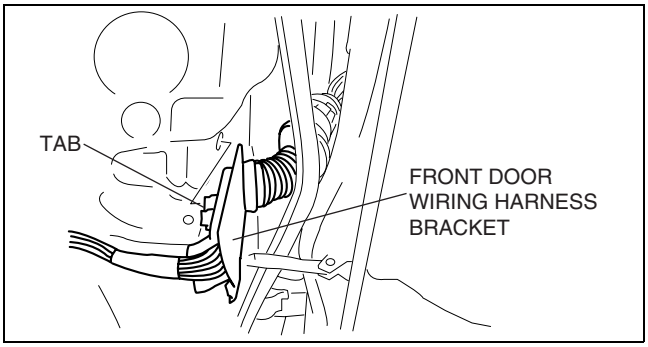
## FRONT DOOR UNIT REMOVAL/INSTALLATION

id091100800500

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Inner garnish (See09-17-20 INNER GARNISH REMOVAL/INSTALLATION)
   (2) Front door trim (See09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION)
   (3) Front door speaker (See09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION)
   (4) Front door glass (See09-12-3 FRONT DOOR GLASS REMOVAL/INSTALLATION)
   (5) Inner handle (See09-14-9 INNER HANDLE REMOVAL/INSTALLATION)
3. Disconnect the power outer mirror connector.
4. Disconnect the front door wiring harness connector. (See 09-11-2 FRONT DOOR REMOVAL/INSTALLATION.)
5. Remove the tab, then remove the front door wiring harness bracket.

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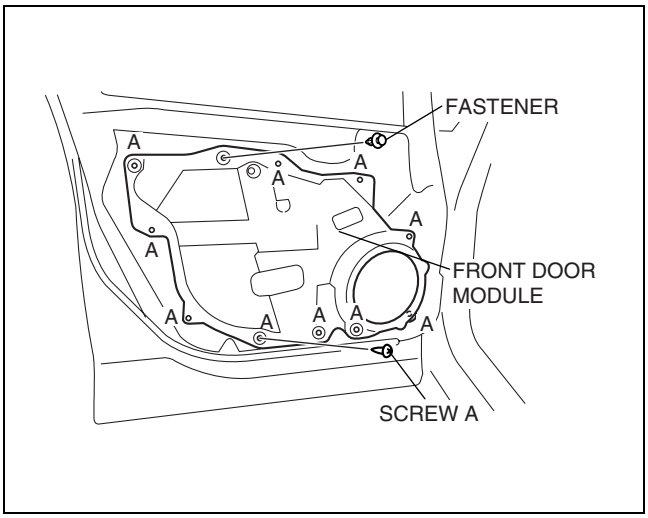
6. Remove screws A and fastener.
7. Remove the front door module.
8. Install in the reverse order of removal.

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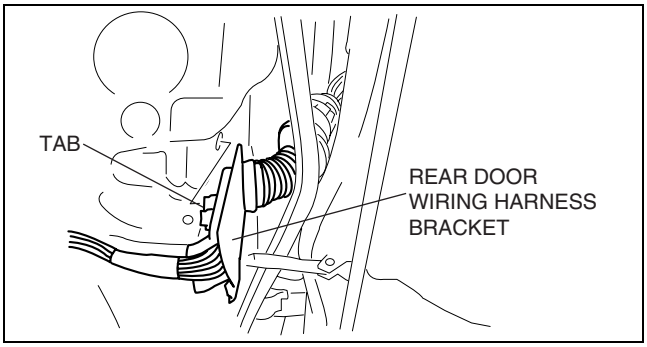
## REAR DOOR UNIT REMOVAL/INSTALLATION

id091100800600

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Inner garnish (See09-17-20 INNER GARNISH REMOVAL/INSTALLATION)
   (2) Rear door trim (See09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION)
   (3) Rear door speaker (See09-20-7 REAR DOOR SPEAKER REMOVAL/INSTALLATION)
   (4) Rear door glass (See09-12-4 REAR DOOR GLASS REMOVAL/INSTALLATION)
   (5) Inner handle (See09-14-9 INNER HANDLE REMOVAL/INSTALLATION)
3. Disconnect the rear door wiring harness connector. (See 09-11-3 REAR DOOR REMOVAL/INSTALLATION.)

4. Remove the tab, then remove the rear door wiring harness bracket.

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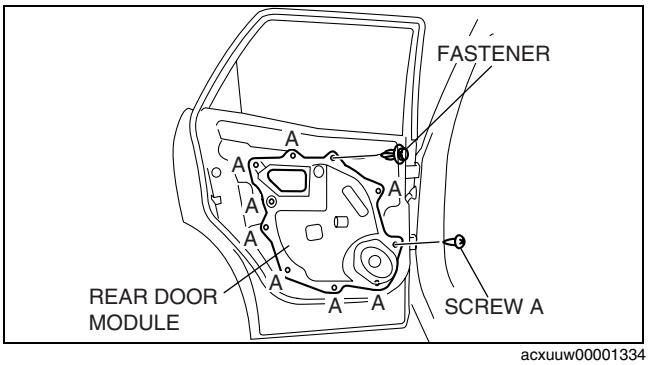
5. Remove screws A and fastener.
6. Remove the rear door module.
7. Install in the reverse order of removal.

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## LIFTGATE REMOVAL/INSTALLATION

id091100800700



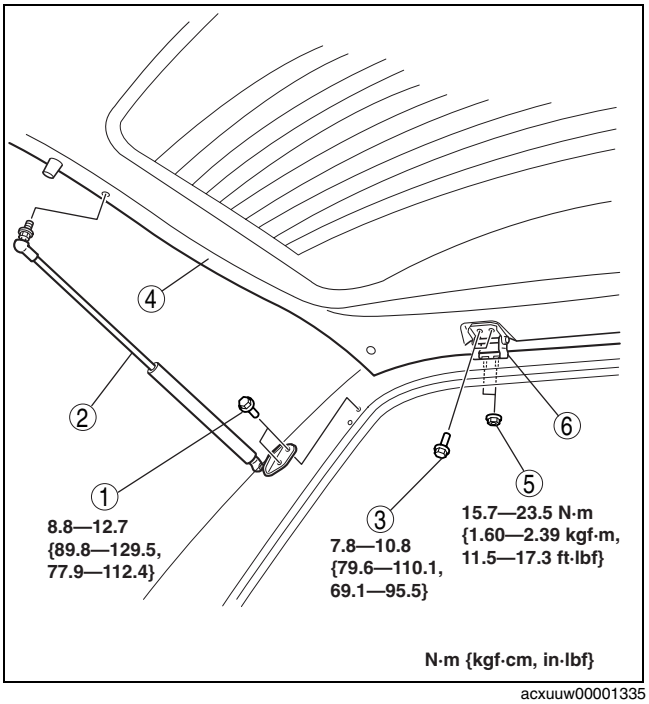
**Warning**

- **When removing the stay damper, serious injury may occur if the stay damper is removed without supporting the liftgate. Always perform the procedure with at least another person.**

1. Disconnect the negative battery cable.
2. Disconnect the rear washer hose.
3. Disconnect the liftgate wiring harness connector.
4. Remove in the order indicated in the figure.

| | |
|---|---|
| 1 | Bolt A |
| 2 | Stay damper |
| 3 | Bolt B |
| 4 | Liftgate |
| 5 | Nut |
| 6 | Liftgate hinge |

5. Install in the reverse order of removal.
6. Adjust the liftgate. (See 09-11-6 LIFTGATE ADJUSTMENT.)

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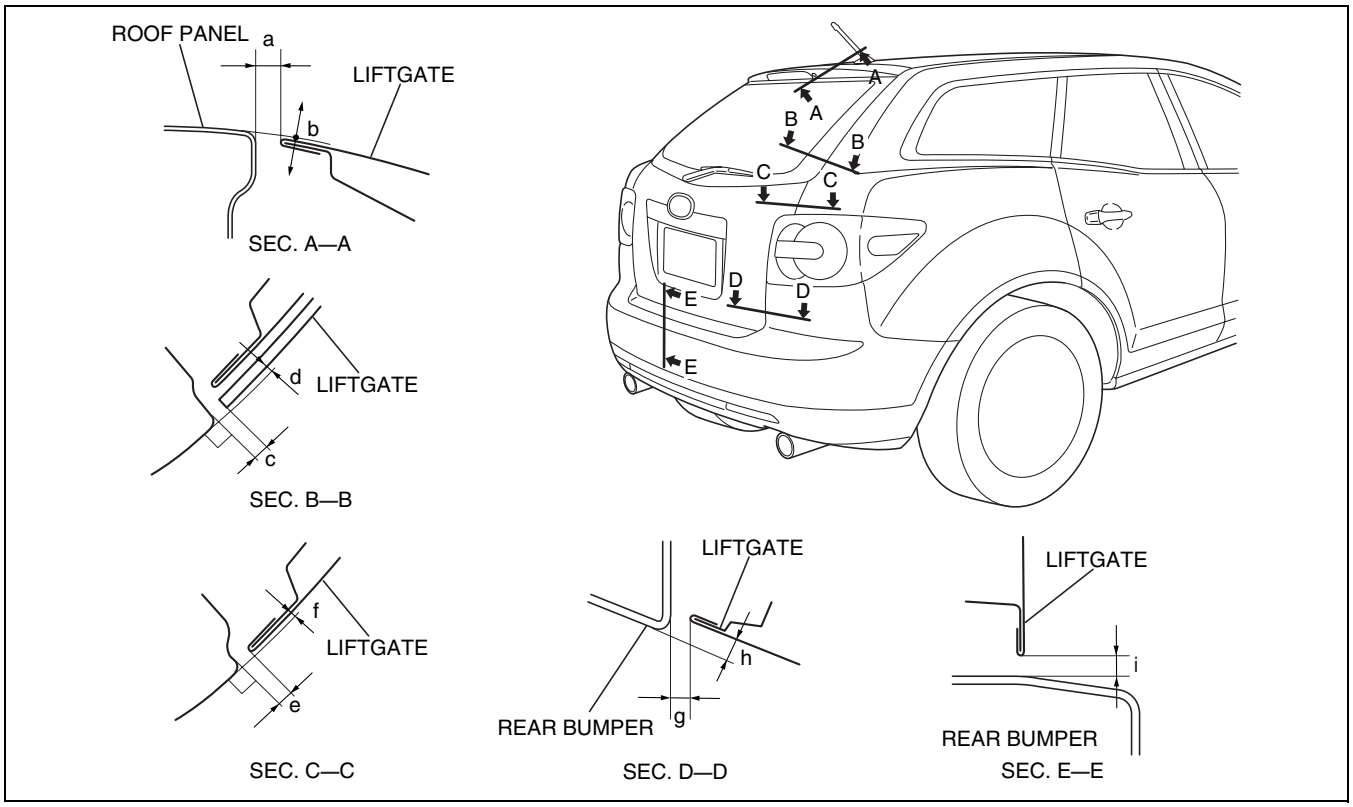
## LIFTGATE ADJUSTMENT

id091100800900

1. Measure the gap and height between the liftgate and the body.
2. Loosen the liftgate hinge installation bolts and adjust the gap by moving the liftgate.

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**Clearance**

**a: 5.0— 7.0 mm {0.19— 0.27 in}**
**b: -2.0— 0.0 mm {-0.08— 0.00 in}**
**c: 1.8— 6.8 mm {0.07— 0.27 in}**
**d: -2.6— 2.6 mm {-0.10— 0.10 in}**
**e: 2.8— 5.2 mm {0.11— 0.20 in}**
**f: -1.2— 1.2 mm {-0.05— 0.05 in}**
**g: 1.5— 6.5 mm {0.06— 0.26 in}**
**h: -1.5— 2.5 mm {0.06— 0.10 in}**
**i: 4.0— 8.0 mm {0.16— 0.31 in}**

3. Tighten the bolts or screws.

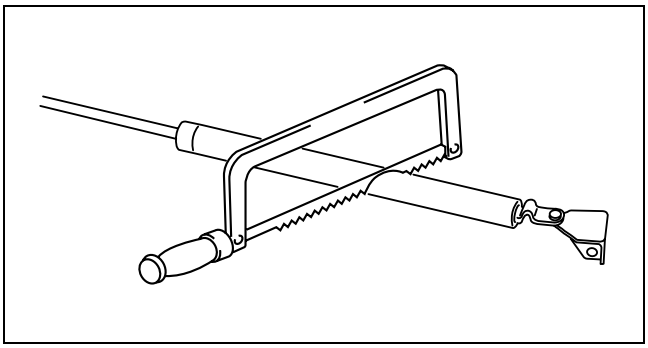
## STAY DAMPER DISPOSAL

id091100801100

**Note**

- The gas in the stay damper is colorless, odorless, and non-toxic.

1. Wear protective eye wear.
2. Lay the stay damper flat.
3. Saw through the stay damper body using hacksaw.
4. Allow the gas to escape from the stay damper.
5. Discard the stay damper.



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# 09-12 GLASS/WINDOWS/MIRRORS


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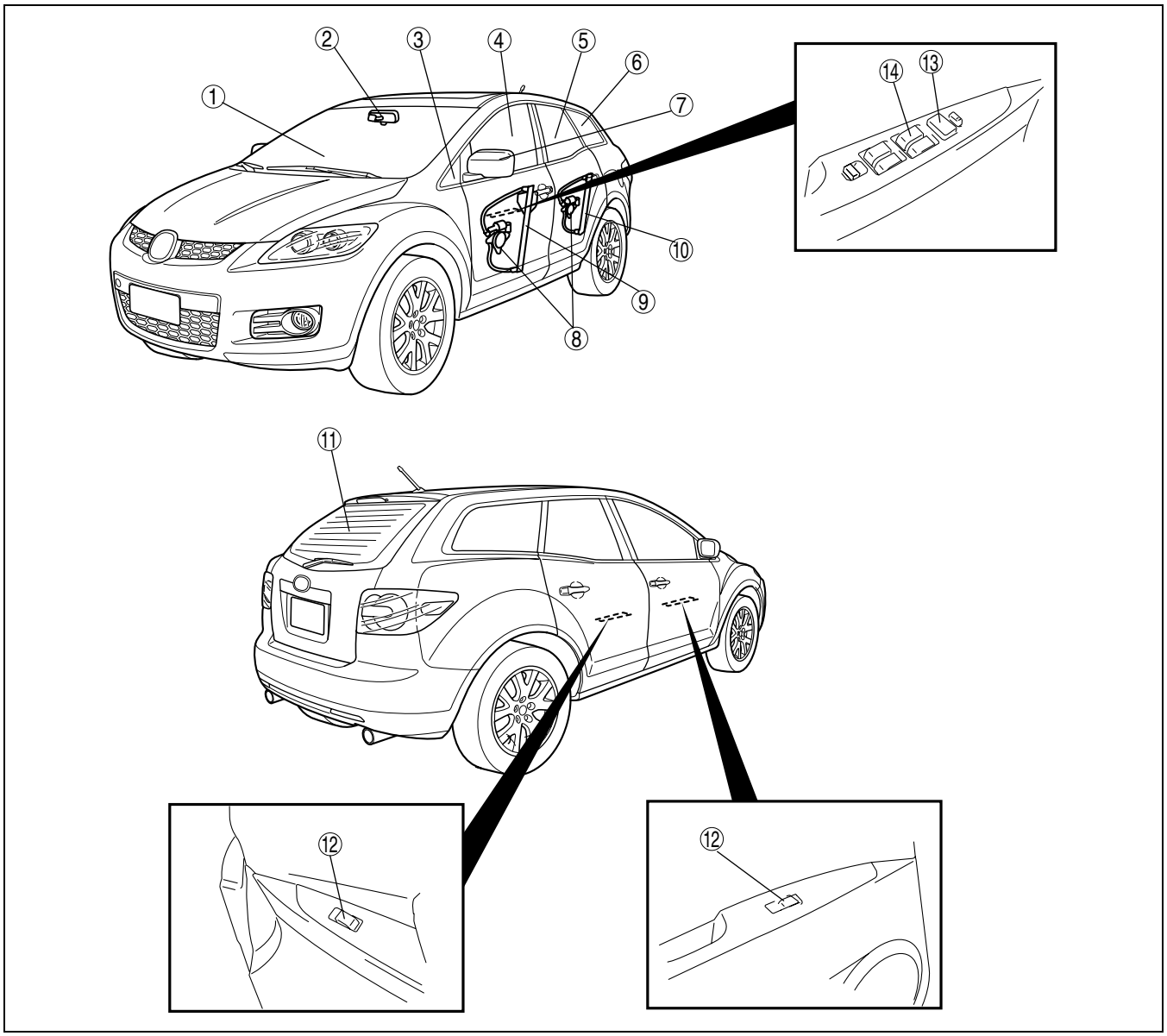


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| | |
|---|---|
| 1 | Windshield<br>(See 09-12-16 WINDSHIELD REMOVAL.)<br>(See 09-12-17 WINDSHIELD INSTALLATION.) |
| 2 | Rearview mirror<br>(See 09-12-35 REARVIEW MIRROR REMOVAL.)<br>(See 09-12-36 REARVIEW MIRROR INSTALLATION.)<br>(See 09-12-36 BASE REMOVAL.)<br>(See 09-12-36 BASE INSTALLATION.) |
| 3 | Side window glass<br>(See 09-12-23 SIDE WINDOW GLASS REMOVAL.)<br>(See 09-12-25 SIDE WINDOW GLASS INSTALLATION.) |
| 4 | Front door glass<br>(See 09-12-3 FRONT DOOR GLASS REMOVAL/ INSTALLATION.) |
| 5 | Rear door glass<br>(See 09-12-4 REAR DOOR GLASS REMOVAL/ INSTALLATION.) |
| 6 | Quarter window glass<br>(See 09-12-27 QUARTER WINDOW GLASS REMOVAL.)<br>(See 09-12-29 QUARTER WINDOW GLASS INSTALLATION.) |
| 7 | Power outer mirror<br>(See 09-12-32 POWER OUTER MIRROR REMOVAL/ INSTALLATION.)<br>(See 09-12-32 OUTER MIRROR GLASS REMOVAL.)<br>(See 09-12-33 OUTER MIRROR GLASS INSTALLATION.)<br>(See 09-12-33 OUTER MIRROR GARNISH REMOVAL.)<br>(See 09-12-33 OUTER MIRROR GARNISH INSTALLATION.)<br>(See 09-12-34 POWER OUTER MIRROR INSPECTION.) |
| 8 | Power window motor<br>(See 09-12-7 POWER WINDOW MOTOR REMOVAL/ INSTALLATION.)<br>(See 09-12-7 POWER WINDOW MOTOR INSPECTION.) |

| | |
|---|---|
| 9 | Front power window regulator<br>(See 09-12-5 FRONT POWER WINDOW REGULATOR REMOVAL/INSTALLATION.) |
| 10 | Rear power window regulator<br>(See 09-12-6 REAR POWER WINDOW REGULATOR REMOVAL/INSTALLATION.) |
| 11 | Rear window glass<br>(See 09-12-20 REAR WINDOW GLASS REMOVAL.)<br>(See 09-12-21 REAR WINDOW GLASS INSTALLATION.)<br>(See 09-12-31 FILAMENT INSPECTION.)<br>(See 09-12-31 FILAMENT REPAIR.) |
| 12 | Power window subswitch<br>(See 09-12-11 POWER WINDOW SUBSWITCH REMOVAL/INSTALLATION.)<br>(See 09-12-11 POWER WINDOW SUBSWITCH INSPECTION.) |
| 13 | Power outer mirror switch<br>(See 09-12-34 POWER OUTER MIRROR SWITCH REMOVAL/INSTALLATION.)<br>(See 09-12-35 POWER OUTER MIRROR SWITCH INSPECTION.) |
| 14 | Power window main switch<br>(See 09-12-8 POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION.)<br>(See 09-12-8 POWER WINDOW MAIN SWITCH INSPECTION.)<br>(See 09-12-13 POWER WINDOW INITIALIZATION PROCEDURE.)<br>(See 09-12-14 TWO-STEP DOWN FUNCTION OPERATIVE/NON-OPERATIVE SWITCHING PROCEDURE.)<br>(See 09-12-15 DOOR GLASS POSITION CHANGE PROCEDURE.) |

### FRONT DOOR GLASS REMOVAL/INSTALLATION

1. Adjust the door glass position as shown in the figure.
2. Disconnect the negative battery cable.
3. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
4. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
5. Remove the front door speaker. (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)

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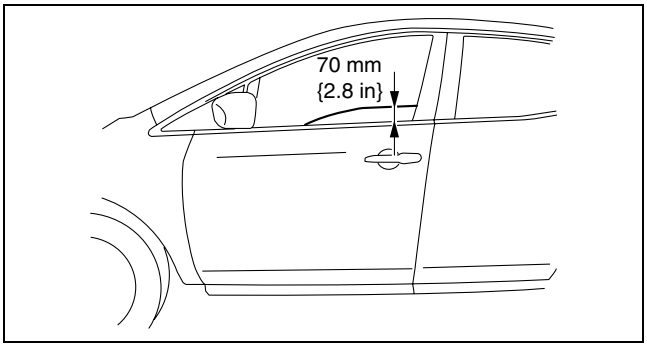


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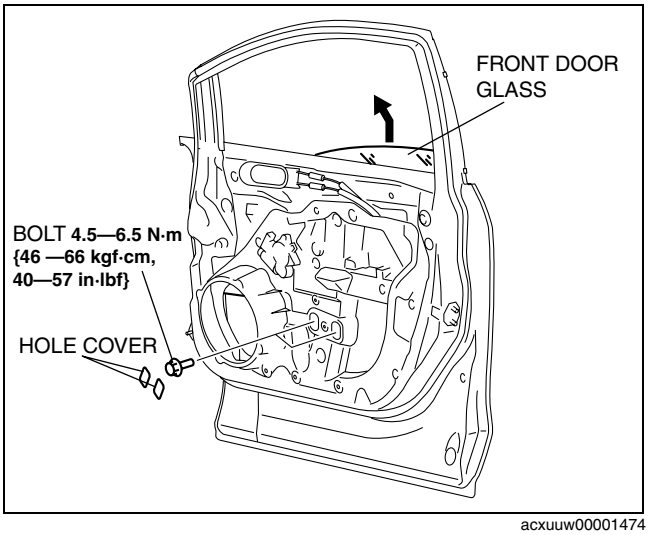
6. Remove the hole cover.
7. Remove the bolts. (See 09-12-4 Front door glass removal note.)
8. Lift the front door glass up and remove it in the direction of the arrow.
9. Install in the reverse order of removal.

**Note**

- When installing the front door glass, align the glass edge with the glass run channel by hand through the speaker installation hole.

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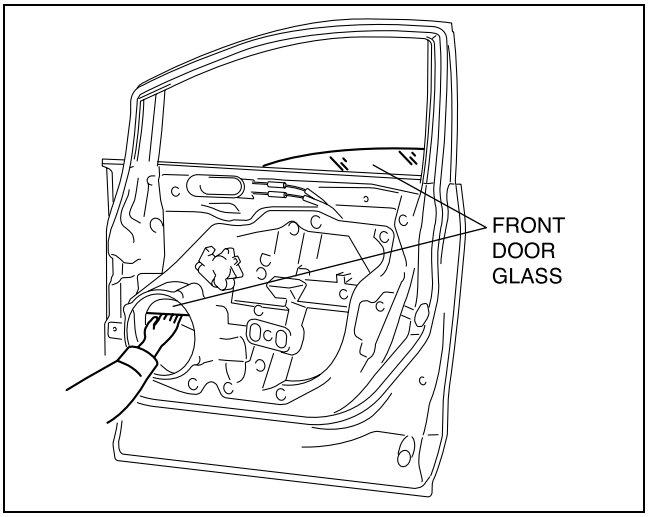
**Front door glass removal note**

1. When remove the front door glass, align the glass edge with the glass run channel by hand through the speaker installation hole.

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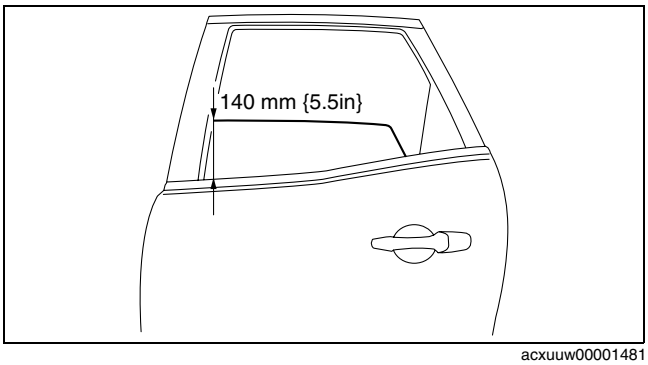
**REAR DOOR GLASS REMOVAL/INSTALLATION**

id091200800500

1. Fully lower the rear door glass.
2. Remove the rear beltline molding. (See 09-16-9 REAR BELTLINE MOLDING REMOVAL/INSTALLATION.)
3. Remove the sail garnish. (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
4. Remove the rear door garnish. (See 09-16-3 REAR DOOR GARNISH REMOVAL/INSTALLATION.)
5. Adjust the door glass position as shown in the figure.
6. Disconnect the negative battery cable.
7. Remove the rear door trim. (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)

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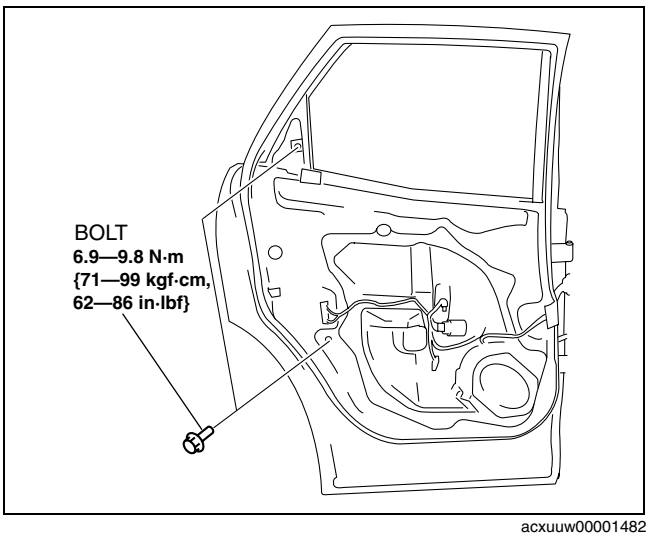
8. Remove the bolts .

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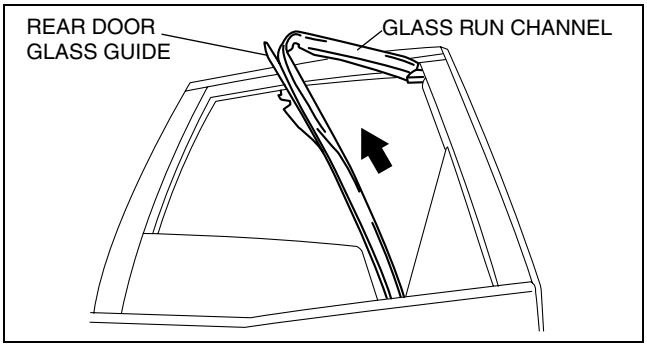
9. Remove the rear door glass guide and glass run channel as a single unit.

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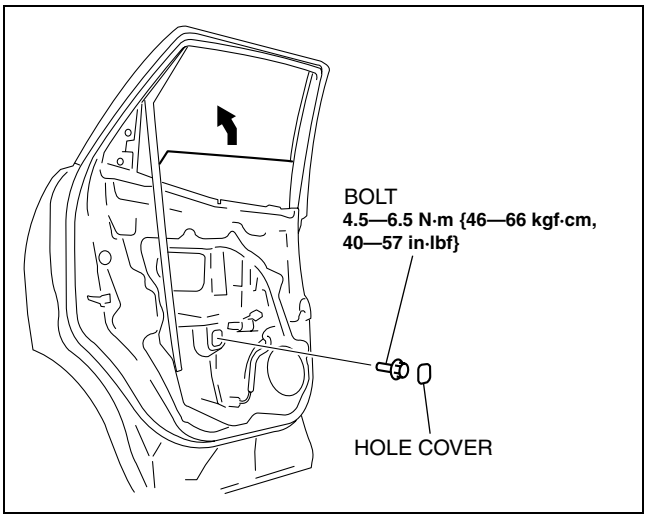
10. Remove the hole cover.
11. Remove the bolt
12. Lift the rear door glass up and remove it in the direction of the arrow.
13. Install in the reverse order of removal.

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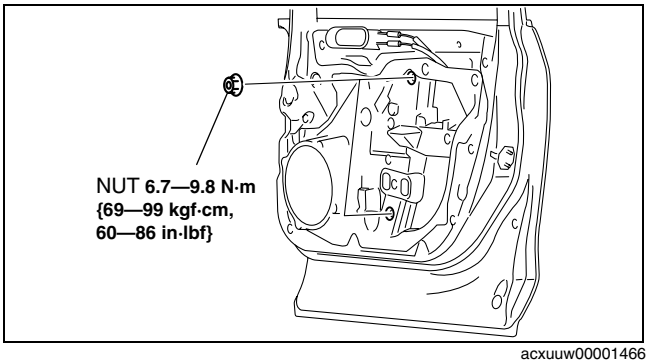
**FRONT POWER WINDOW REGULATOR REMOVAL/INSTALLATION**

id091200800200

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Inner garnish (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
   (2) Front door trim (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
   (3) Front door speaker. (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)
   (4) Front door glass (See 09-12-3 FRONT DOOR GLASS REMOVAL/INSTALLATION.)
   (5) Power window motor (See 09-12-7 POWER WINDOW MOTOR REMOVAL/INSTALLATION.)
   (6) Front beltline molding (See 09-16-9 FRONT BELTLINE MOLDING REMOVAL/INSTALLATION.)
3. Remove the nuts .

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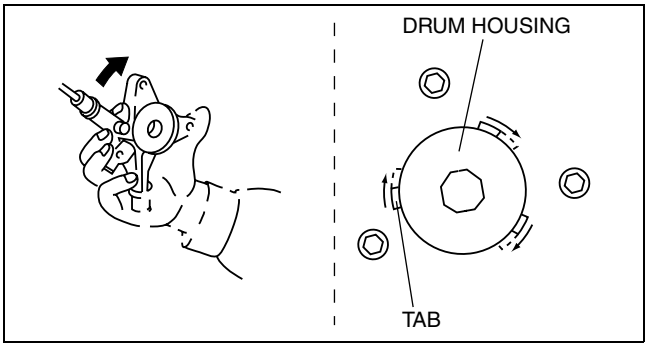
4. Insert a hand through the speaker installation hole, rotate the drum housing in the direction shown in the figure to detach the tabs from the front door unit.

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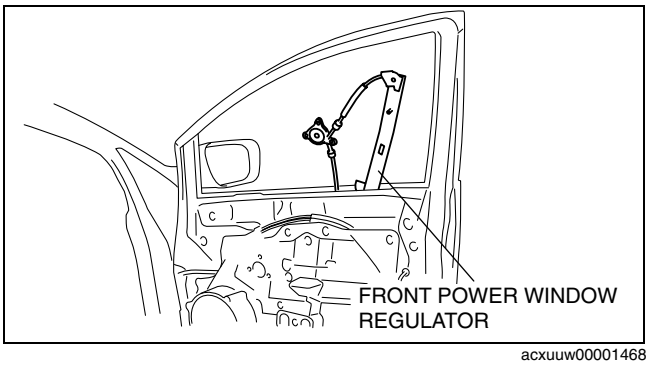
5. Remove the front power window regulator as shown in the figure.
6. Install in the reverse order of removal.

**Caution**
- **Make sure the cable does not unspool from the drum housing when installing.**

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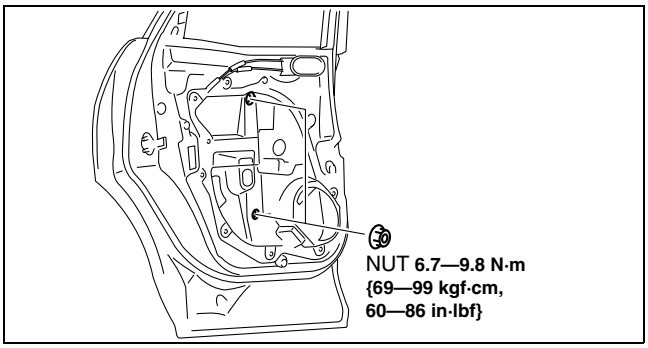
**REAR POWER WINDOW REGULATOR REMOVAL/INSTALLATION**

id091200800300

1. Disconnect the negative battery cable.
2. Remove the sail garnish. (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
3. Remove the rear door garnish. (See 09-16-3 REAR DOOR GARNISH REMOVAL/INSTALLATION.)
4. Remove the rear door trim. (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
5. Remove the rear door speaker. (See 09-20-7 REAR DOOR SPEAKER REMOVAL/INSTALLATION.)
6. Remove the rear door glass. (See 09-12-4 REAR DOOR GLASS REMOVAL/INSTALLATION.)
7. Remove the power window motor. (See 09-12-7 POWER WINDOW MOTOR REMOVAL/INSTALLATION.)
8. Remove the nuts.

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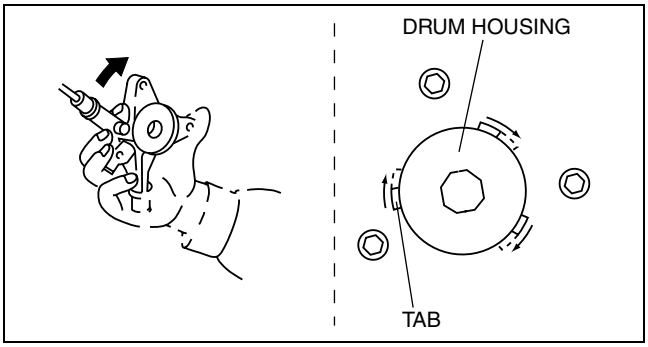
9. Insert a hand through the speaker installation hole, rotate the drum housing in the direction shown in the figure to detach the tabs from the rear door unit.

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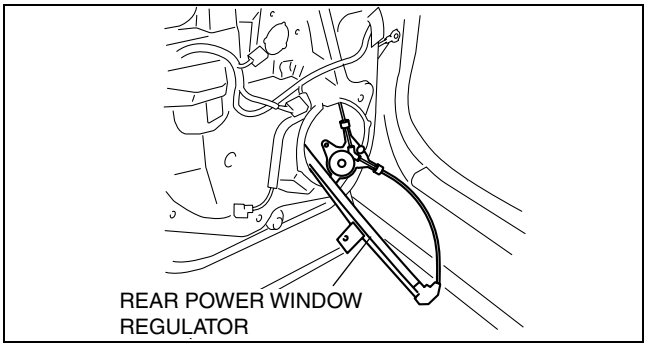
10. Remove the rear power window regulator through the speaker installation hole.
11. Install in the reverse order of removal.

**Caution**
- **Make sure the cable does not unspool from the drum housing when installing.**

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### POWER WINDOW MOTOR REMOVAL/INSTALLATION

id091200803700

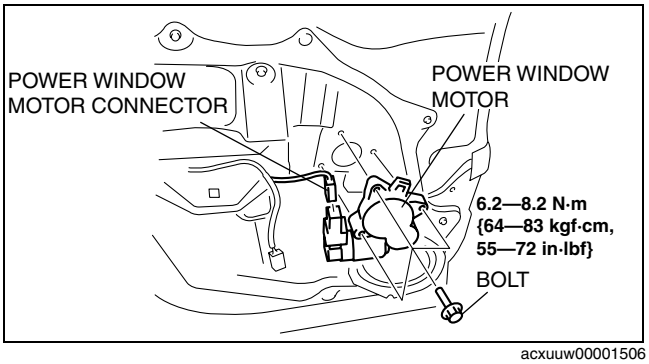
1. Fully lower the rear door glass.
2. Disconnect the negative battery cable.
3. Remove the following parts:

**Front door**
- Inner garnish (See.09-17-20 INNER GARNISH REMOVAL/INSTALLATION)
- Front door trim (See.09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION)

**Rear door**
- Sail garnish (See.09-17-12 SAIL GARNISH REMOVAL/INSTALLATION)
- Rear door trim (See.09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION)

4. Remove the bolts.
5. Remove the power window motor from the power window regulator.
6. Disconnect the power window motor connector.
7. Install in the reverse order of removal.

**Note**
- When installing the power window motor to the power window regulator drum, the drum housing tabs may detach from the door module. If this happens, insert a hand through the speaker installation hole to engage the drum housing tabs, and install the power window motor to the drum while supporting the drum housing.




acxuuw00001506

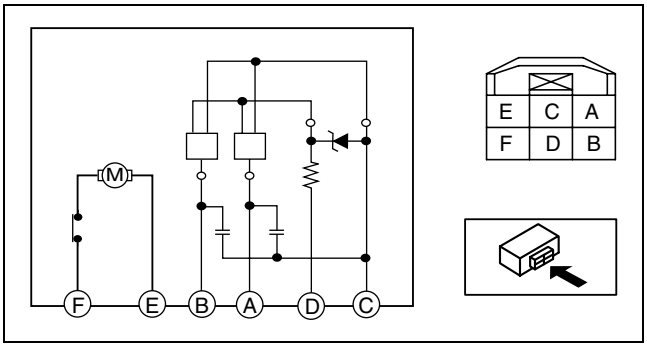
### POWER WINDOW MOTOR INSPECTION

id091200800800

**Front Side**

1. Apply battery positive voltage and connect the ground to power window motor terminals E and F, and then inspect the power window motor operation.
   - If the power window motor does not operate as indicated in the table, replace it.

**Caution**
- **If the power window motor temperature is high, the motor may not rotate due to the motor internal bimetal function. Leave it untouched for about 3 min to cool it down, then reinspect.**




acxuuw00001507

| Operation | Terminal | |
|---|---|---|
| | F | E |
| Open | B+ | Ground |
| Close | Ground | B+ |

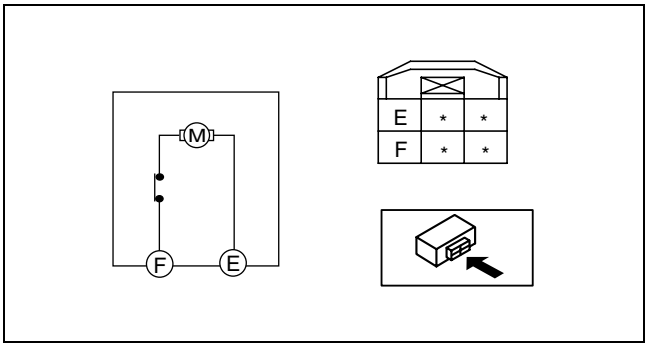
2. Connect the battery positive voltage to power window motor terminal D and connect terminal C to ground.
3. Operate the power window motor and measure the voltage at terminals A and B.
   - If there is any malfunction, replace the power window motor.

**Voltage**
- **Pulse: max. 12 V/min. 0 V**

**Rear Side**

1. Apply battery positive voltage and connect the ground to the power window motor terminals, and then inspect the power window motor operation.
   - If the power window motor does not operate as indicated in the table, replace it.

   **Caution**
   - **If the power window motor temperature is high, the motor may not rotate due to the motor internal bimetal function. Leave it untouched for about 3 min to cool it down, then reinspect.**



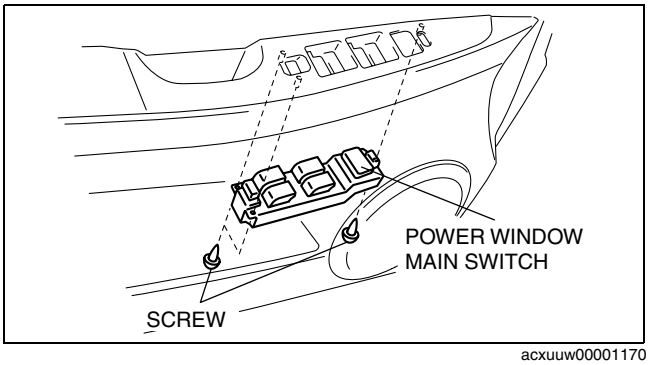

acxuuw00001511

| Operation | Terminal | |
|---|---|---|
| | F | E |
| Open | B+ | Ground |
| Close | Ground | B+ |

**POWER WINDOW MAIN SWITCH REMOVAL/INSTALLATION**

id091200801900

1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION)
4. Disconnect the power door mirror switch connector and the power window main switch connector.
5. Remove the screws, then the power window main switch.
6. Install in the reverse order of removal.

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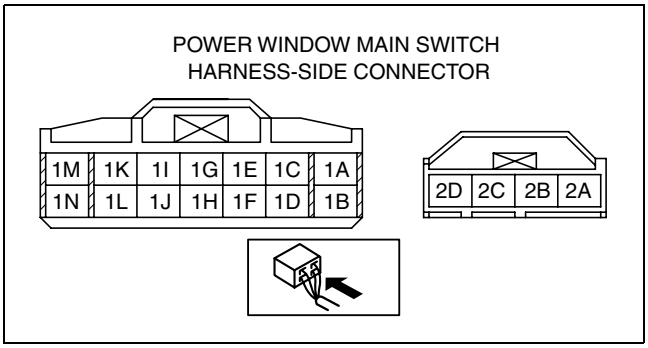
**POWER WINDOW MAIN SWITCH INSPECTION**

id091200802000

**Note**
- Before proceeding with diagnosis of malfunctioning power windows, ensure the POWER WINDOW INITIALIZATION PROCEDURE has been performed.

**Driver's Side**

1. Measure the voltage at each terminal (other than terminals 1M and 2A).
   - If the voltage is not as specified in the Terminal Voltage Table, inspect the parts under "inspection item(s)" and related wiring harnesses.
2. Disconnect the negative battery cable.
3. Inspect the power window main switch connector for continuity at terminal 1M and 2A.
4. If the system does not work properly even though the inspection items or related wiring harnesses do not have any malfunction, replace the power window main switch.

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| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|
| 1C | ACC | MIRROR 7.5 A | Ignition switch is at ACC position | B+ | • Inspect MIRROR 7.5 A fuse<br>• Related wiring harnesses |
| | | | Ignition switch is at LOCK position | 1.0 or less | |
| 1E | IG 1 | IG KEY1 15 A fuse | Ignition switch is at ON position | B+ | • Inspect IG KEY1 15 A fuse<br>• Related wiring harnesses |
| | | | Ignition switch is at LOCK position | 1.0 or less | |
| 1F | Power-cut signal | Power window subswitch | Ignition switch at ON and power-cut switch at UNLOCK | B+ | • Power window subswitch(See09-12-11 POWER WINDOW SUBSWITCH INSPECTION)<br>• Related wiring harnesses |
| 1G | Communication | Power window subswitch | — | — | — |
| 1H | Communication | BCM | — | — | — |
| 1I | Close output | Power window motor | While door glass is opening | 1.0 or less | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | While door glass is closing | B+ | |
| 1K | Open output | Power window motor | While door glass is opening | B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | While door glass is closing | 1.0 or less | |
| 1M | GND | Body ground | Under any condition: Inspect for continuity to ground | Continuity detected | • GND |
| 1N | Power supply | P/W 30 A fuse | Under any condition | B+ | • P/W 30 A fuse<br>• Related wiring harnesses |
| 2A | Sensor ground | Power window motor | Under any condition: inspect for continuity to ground | Continuity detected | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| 2B | Power supply | Power window motor | While IG ON or IG OFF timer works | B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| 2C | Pulse 1 | Power window motor | Door glass is not in motion | 0 or B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | Door glass is in motion | Alternates between 0 and B+ | |
| 2D | Pulse 2 | Power window motor | Door glass is in motion | Alternates between 0 and B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | Door glass is not in motion | 0 or B+ | |

**Rear Side**

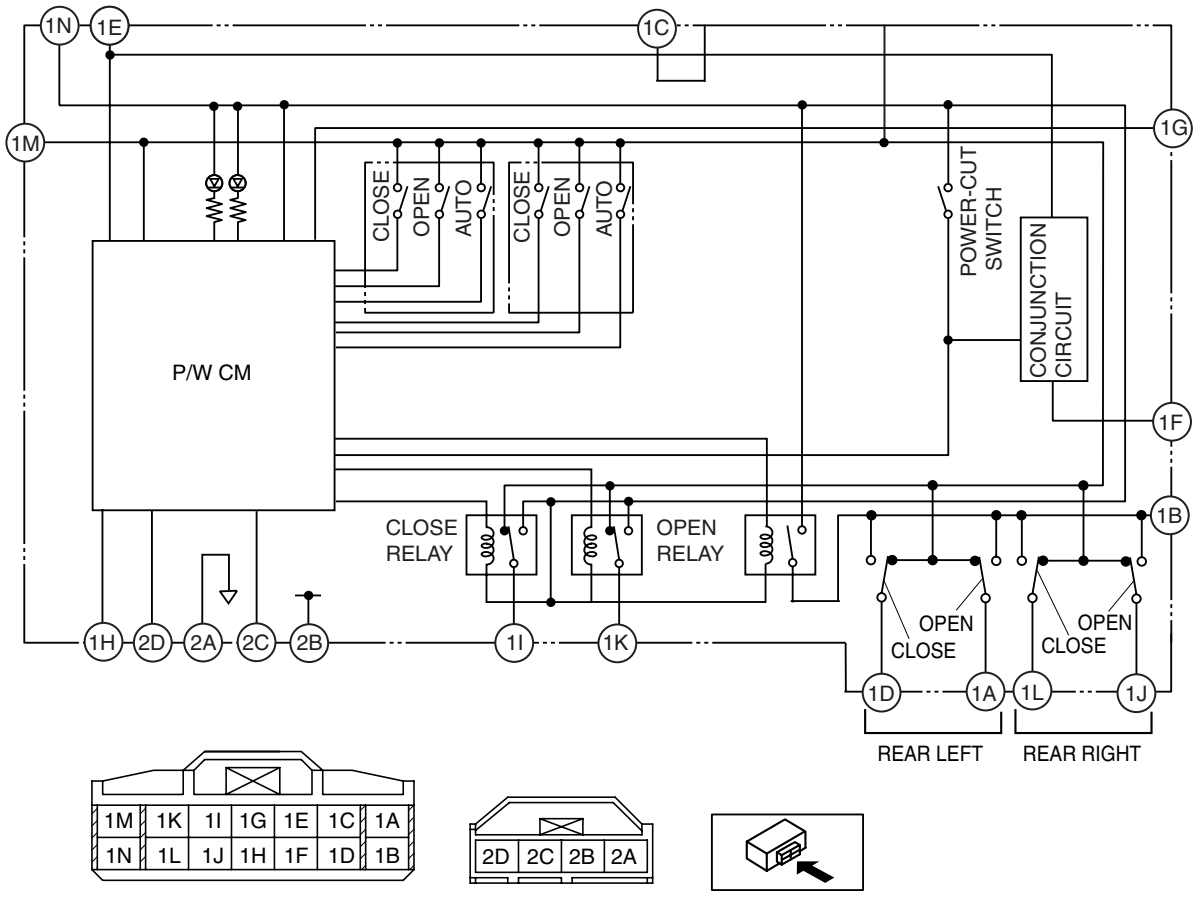
1. Remove the power window main switch. (See09-12-8 POWER WINDOW MAIN SWITCH REMOVAL/ INSTALLATION.)
2. When inspecting the rear, turn the power-cut switch UNLOCK.
3. Inspect for continuity between the power window main switch terminals.
   - If not as specified, replace the power window main switch.

**Rear right** ○—○ : Continuity

| Switch position | Terminal | | | |
|---|---|---|---|---|
| | 1B | 1J | 1M | 1L |
| CLOSED | | ○—○ | | ○ |
| OFF | | | ○—○—○ | |
| OPEN | ○—○ | | | ○—○ |

**Rear left** ○—○ : Continuity

| Switch position | Terminal | | | |
|---|---|---|---|---|
| | 1B | 1M | 1A | 1D |
| CLOSED | | ○—○ | | ○ |
| OFF | | ○—○—○ | | |
| OPEN | ○—○ | | ○—○ | |

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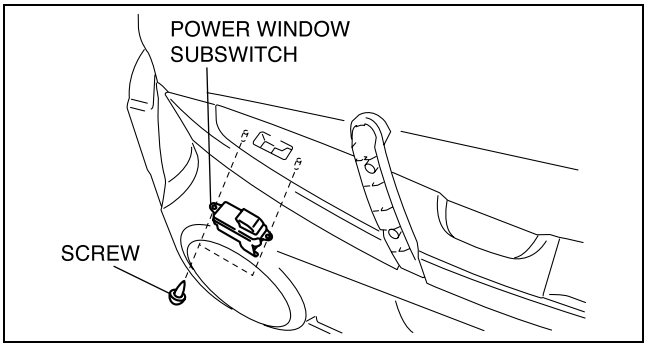
## POWER WINDOW SUBSWITCH REMOVAL/INSTALLATION

id091200802100

### Passenger's Side

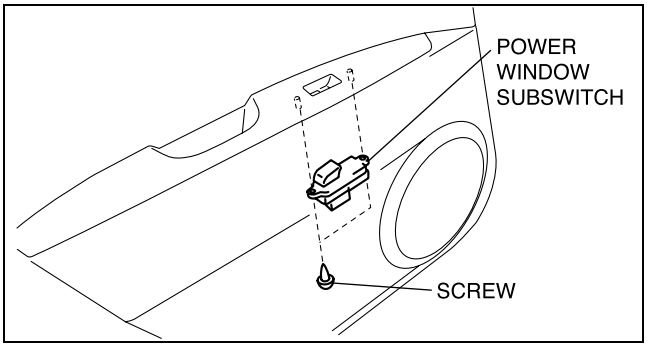
1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION)
4. Disconnect the power window subswitch connector.
5. Remove the screws, then the power window subswitch.
6. Install in the reverse order of removal.




acxuuw00001182

### Rear Side

1. Disconnect the negative battery cable.
2. Remove the sail garnish. (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
3. Remove the rear door trim. (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION)
4. Disconnect the power window subswitch connector.
5. Remove the screws, then the power window subswitch.
6. Install in the reverse order of removal.



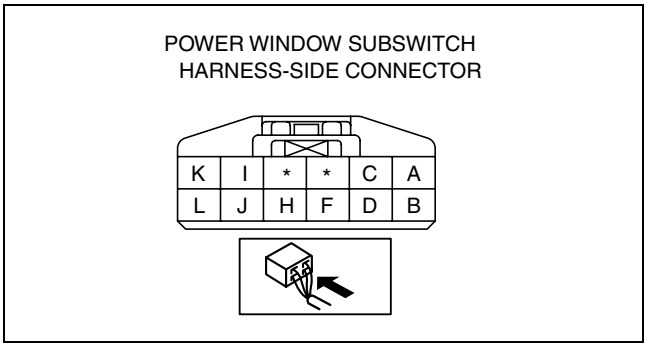

acxuuw00001183

## POWER WINDOW SUBSWITCH INSPECTION

id091200802200

### Passenger's Side

1. Measure the voltage at each terminal (other than terminals H and I).
   - If the voltage is not as specified in the Terminal Voltage Table, inspect the parts under "Inspection item(s)" and related wiring harnesses.
2. Disconnect the negative battery cable.
3. Inspect the power window subswitch connector for continuity at terminals H and I.
4. If the system does not work properly even though the inspection items or related wiring harnesses do not have any malfunction, replace the power window subswitch.

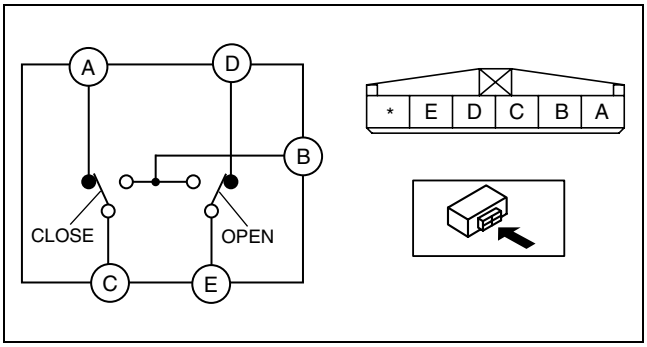



acxuuw00001387

| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|
| L | Power-cut signal | Power window main switch | Ignition switch at ON and power-cut switch at UNLOCK | B+ | • Power window main switch(See09-12-8 POWER WINDOW MAIN SWITCH INSPECTION)<br>• Related wiring harnesses |
| K | Open output | Power window motor | While door glass is opening | B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | While door glass is closing | 1.0 or less | |
| J | Pulse 1 | Power window motor | Door glass moving | Alternates between 1.0 and B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| I | Power supply | P/W 30 A fuse | Under any condition | B+ | • P/W 30 A fuse<br>• Related wiring harnesses |
| H | Pulse 2 | Power window motor | Door glass moving | Alternates between 1.0 or less and B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | Door glass stopped | 1.0 or less or B+ | |
| F | GND | Body ground | Under any condition: Inspect for continuity to ground | Continuity detected | • GND |
| D | Sensor ground | Power window motor | Under any condition: inspect for continuity to ground | Continuity detected | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| C | Close output | Power window motor | While door glass is opening | 1.0 or less | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| | | | While door glass is closing | B+ | |
| B | Power supply | Power window motor | Ignition switch at ON or during IG-OFF timer | B+ | • Power window motor (See09-12-7 POWER WINDOW MOTOR INSPECTION.)<br>• Related wiring harnesses |
| A | Communication | Power window main switch | — | — | — |

**Rear Side**

1. Inspect for continuity between the power window subswitch terminals.
   - If not as specified, replace the power window subswitch.

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○—○ : Continuity

| Switch position | Terminal | | | | |
|---|---|---|---|---|---|
| | B | C | A | D | E |
| Close | ○ | ○ | | ○ | ○ |
| OFF | | ○ | ○ | ○ | ○ |
| Open | ○ | | | | ○ |
| | | ○ | ○ | | |

acxuuw00001389

**POWER WINDOW INITIALIZATION PROCEDURE**

id091200807400

**Note**

- Initial setting must be performed for the switch of each window front and rear.
- If the following operations have been performed, initial setting is reset, and auto up/down and two-step down operation are disabled. Therefore, performing initial setting is necessary.
  - — Negative battery cable disconnected or power window system power supply fuse removed. (perform initial setting for the switches of all seats.)
  - — Power window switch connector disconnected. (Perform initial setting for the switch connected with the connector.)
  - — Prolonged open/close operation of the power window main or sub switches causes the circuit breaker to activate and automatic operation is disabled.

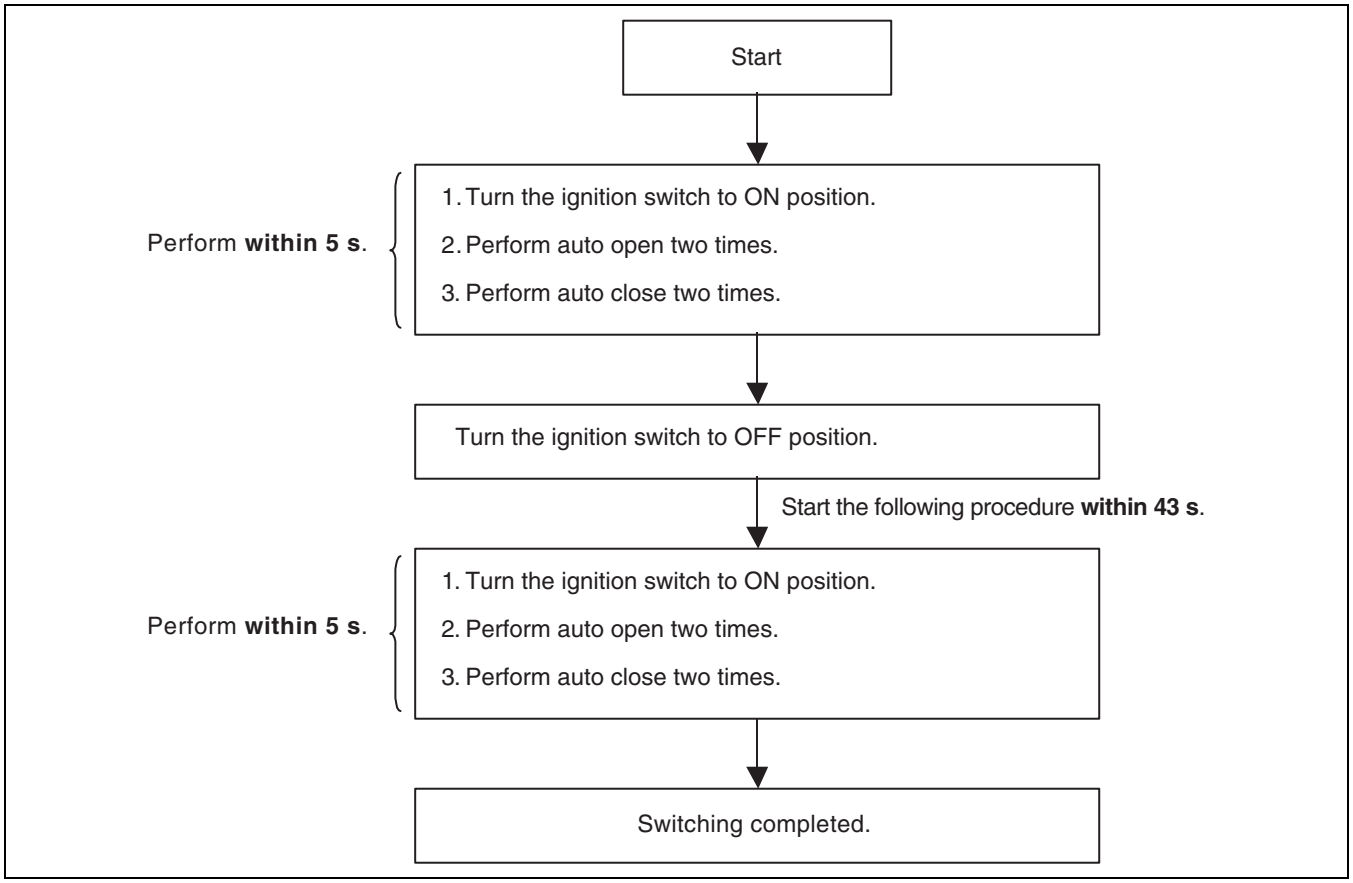
1. Turn the ignition switch to the ON position.
2. Press the switch of each window and fully open the door glass.
3. Pull the switch of each window to the manual-up position to fully close the door glass, and keep holding the switch up at the position for **approx. 2 s.**

## TWO-STEP DOWN FUNCTION OPERATIVE/NON-OPERATIVE SWITCHING PROCEDURE

id091200803500

**Note**

- By following the procedure below, the two-step down function is switched to non-operative when it is operative, and to operative when it is non-operative.

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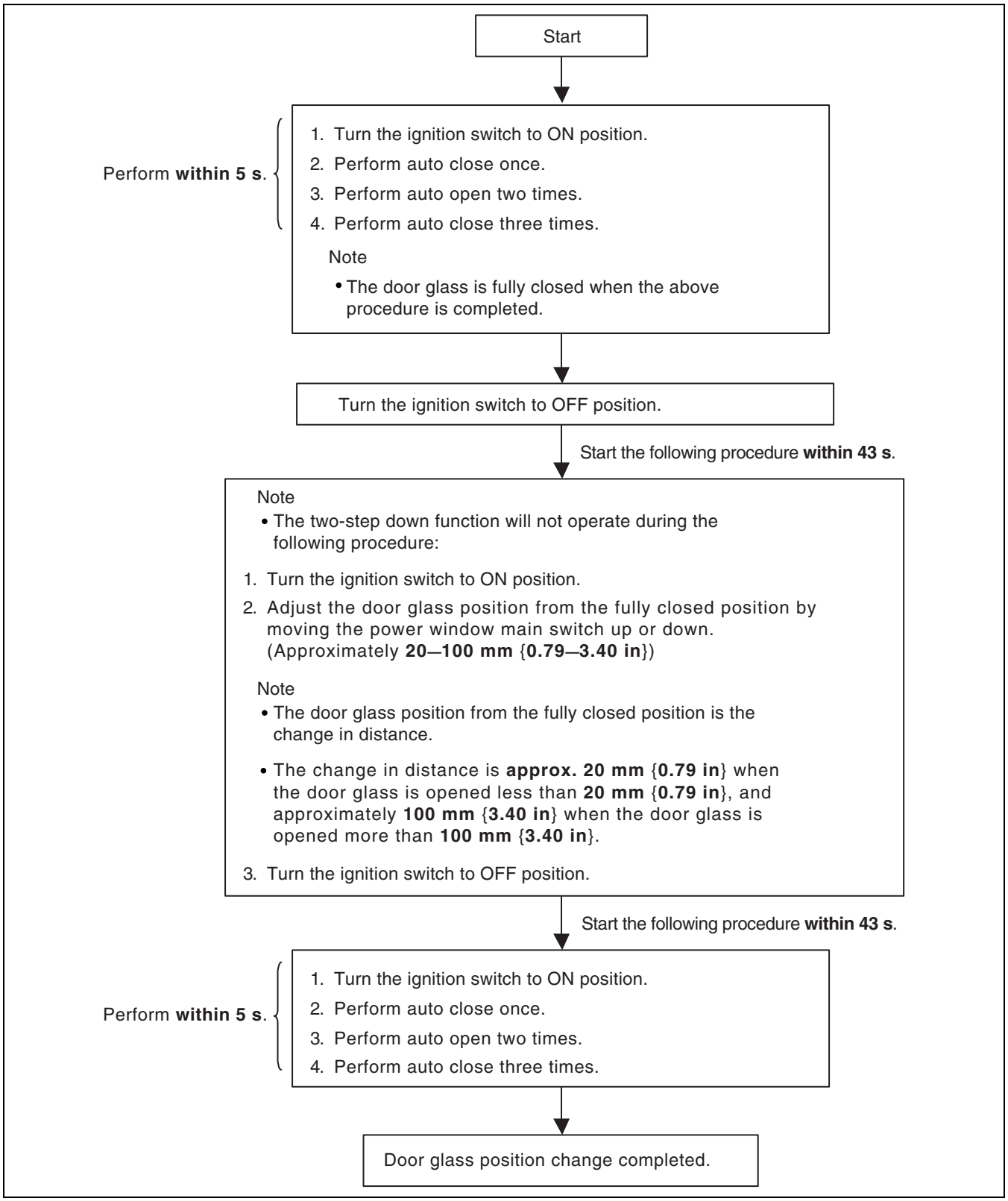
## DOOR GLASS POSITION CHANGE PROCEDURE

id091200803600

**Note**

- After performing the following procedure, verify that the two-step down function operates normally and the door glass position has changed. If the two-step down function does not operate or the door glass position has not changed, the procedure was not performed properly. Repeat the procedure from the beginning.

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**WINDSHIELD REMOVAL**

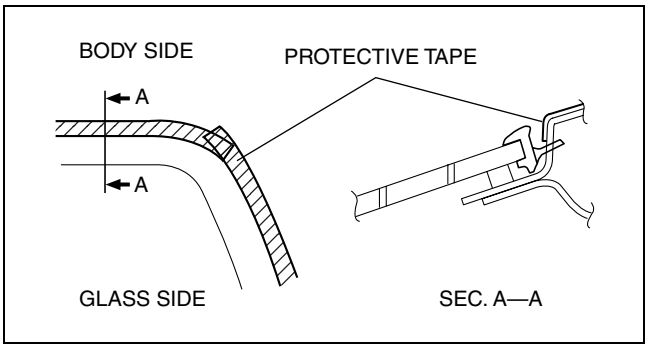
id091200801300

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Windshield wiper arm and blade (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
   (2) Cowl grille (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
   (3) Rearview mirror (See 09-12-35 REARVIEW MIRROR REMOVAL.)
   (4) Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (5) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (6) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (7) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
3. Set the headliner out of the way.
4. Apply protective tape along the edge of the body.

**Note**
- Overlap and adhere the protective tape to the corners to prevent damage.

5. Remove the windshield molding by pulling it outward.

**Note**
- If the windshield molding is difficult to remove, warm the windshield molding using a hot air blower.
- The windshield molding is a replacement part.

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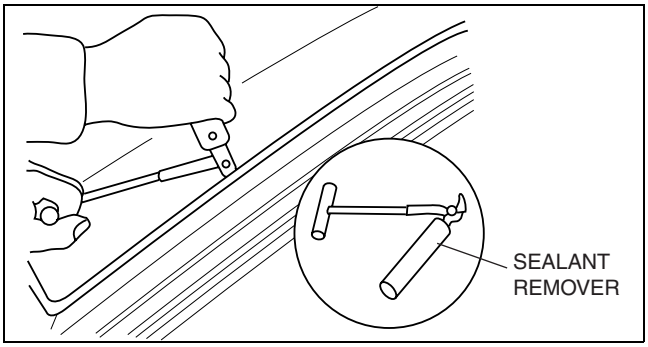
**Not Reusing Windshield**

**Note**
- For the areas of the sealant that are difficult to cut, use the piano wire and follow the procedure under “Reusing Windshield”.

1. Cut out the sealant all around the glass using a sealant remover.
2. Remove the windshield.

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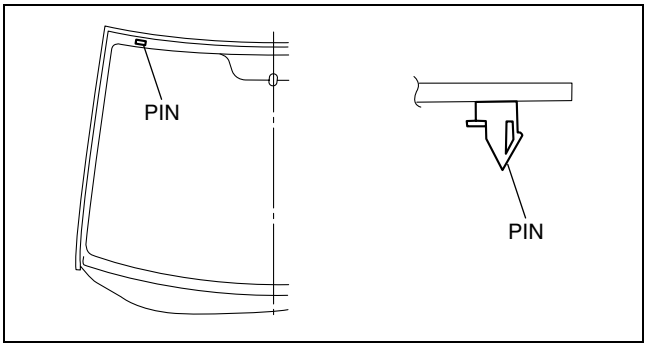
**Reusing Windshield**

**Warning**
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

**Note**
- Before removing the windshield from the body, mark the position of the windshield by affixing tape to the windshield and body panel.

1. Avoiding the pin on the inside of the vehicle, insert the piano wire which has been cut to sufficient length.



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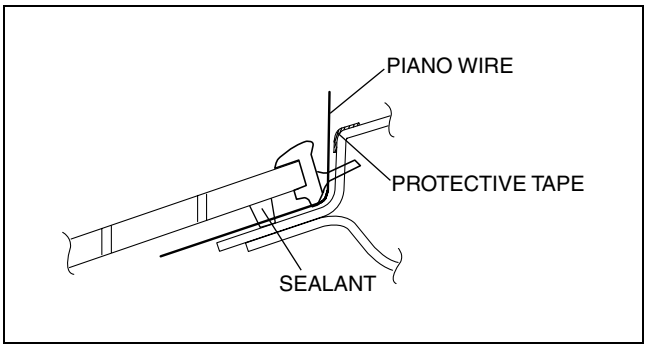
2. Wind each end of the piano wire around a bar.

**Note**
- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking due to localized heating.



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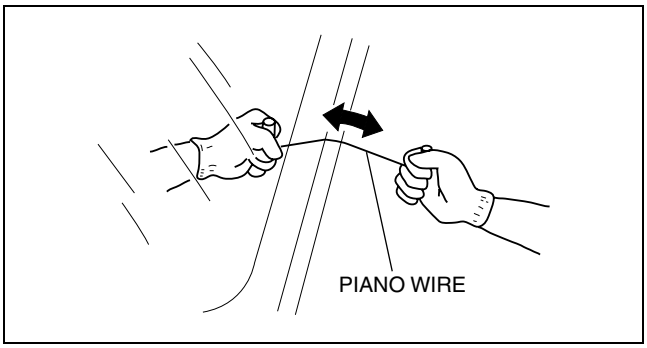
3. Secure one end of the piano wire, and while pulling the other end, cut the sealant around the windshield.
4. Pinch the pin from the inside of the vehicle and detach it.
5. Remove the windshield.
6. If the pin is damaged, remove the pin.

**Note**
- Before removing the pin from the windshield glass, place an alignment mark on the windshield.



acxuuw00001524

**WINDSHIELD INSTALLATION**

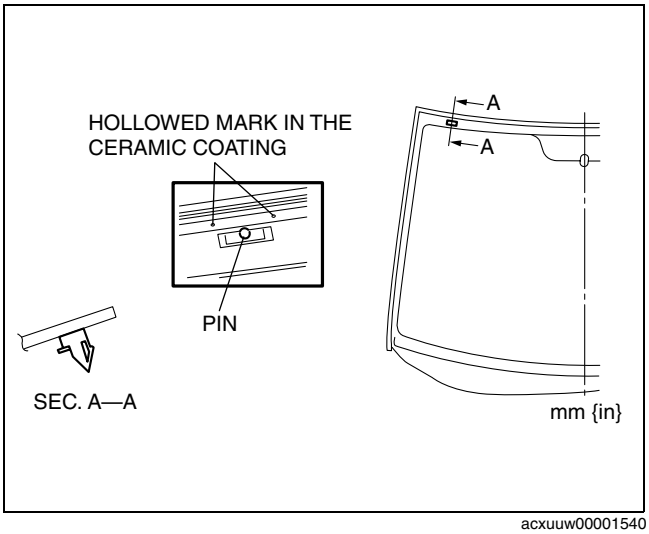
id091200801400

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

**Caution**
- **If a door is opened or closed when all the window glass is closed, the resulting change in air pressure could cause the sealant to crack preventing the proper installation of the glass. Keep the door glass opened until the windshield installation is completed.**

1. Remove the sealant along the perimeter of the glass using a cutting a razor. (When reusing the glass)
2. Clean and degrease an **approx. 50 mm {1.97 in}** wide strip along the perimeter of the windshield.
3. Inspect the glass for cracks. If it is cracked, chamfer it using sandpaper.

4. Align the marks made before removal and install the pin to the windshield referring to the figure. (when reusing the glass, and the pin was removed)

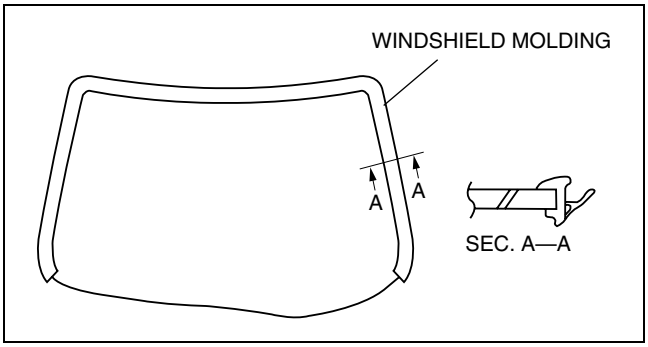



acxuuw00001540

5. Install the windshield molding.
6. Use glass primer on the glass, then allow it to dry for **approx. 30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

**Note**
- Make sure to apply primer to the hollowed marks in the ceramic coating.

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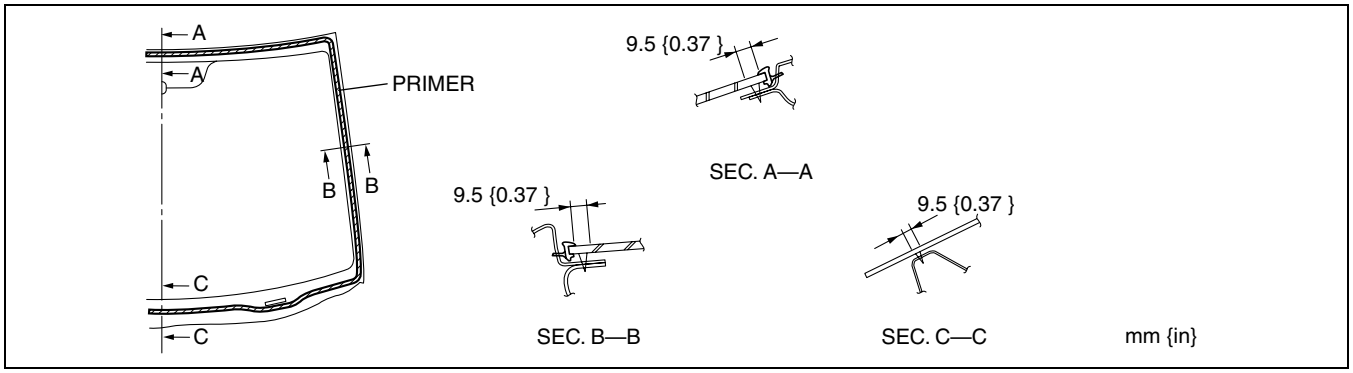
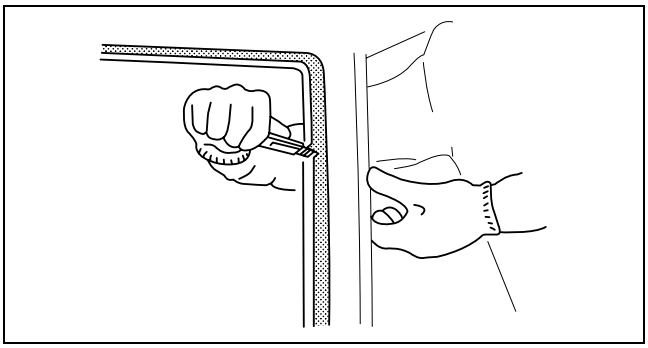



acxuuw00001542

7. Cut away the old sealant using a razor or scraper so that **1— 2 mm {0.04— 0.07 in}** thickness of sealant remains along the perimeter of the frame.
8. If the sealant has come off completely in any one place, apply some primer after degreasing, and allow it **approx. 30 min** to dry. Then apply **2 mm {0.08 in}** thickness of new sealant.

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

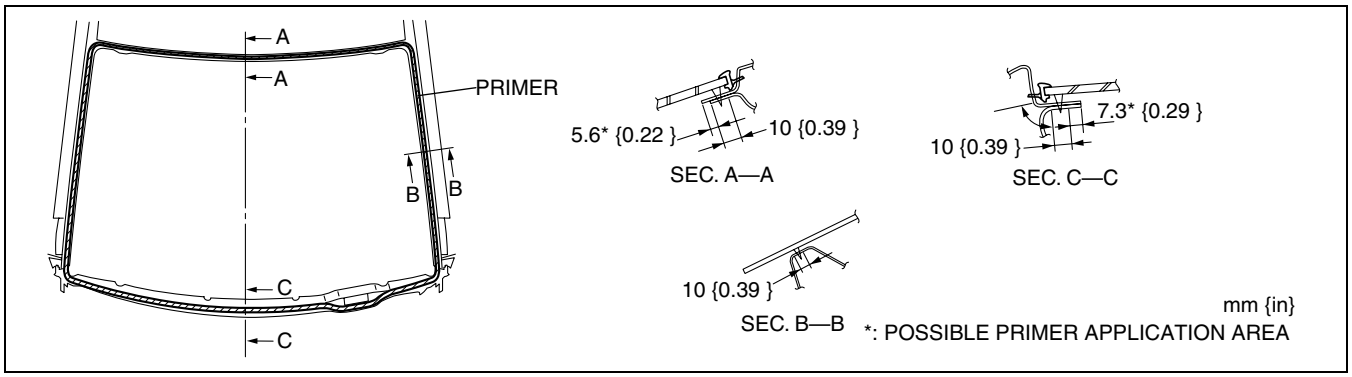


acxuuw00001543

9. Clean and degrease along the perimeter of the bonding area on the body.
10. Apply body primer on the body as shown in the figure, then allow it to dry for **approx. 30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

**Note**
- Apply primer to the hollowed marks in the ceramic coating.

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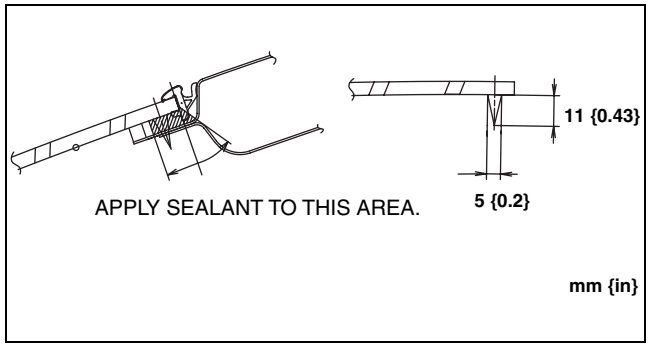
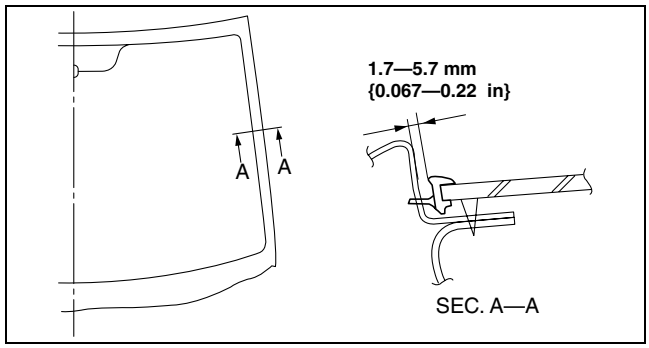
11. Apply sealant to the area of the glass surface as shown in the figure.
12. Insert the windshield locator pins to the body and install the windshield.




acxuuw00001545

13. Verify that the clearance of the A-pillar is within the range shown in the figure, and press along the perimeter of the glass.
14. Install the headliner.
15. Install the following parts:
    (1) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
    (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
    (3) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
    (4) Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
    (5) Rearview mirror (See 09-12-36 REARVIEW MIRROR INSTALLATION.)
    (6) Cowl grille (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
    (7) Windshield wiper arm and blade (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
16. Allow the sealant to harden completely.




acxuuw00001546

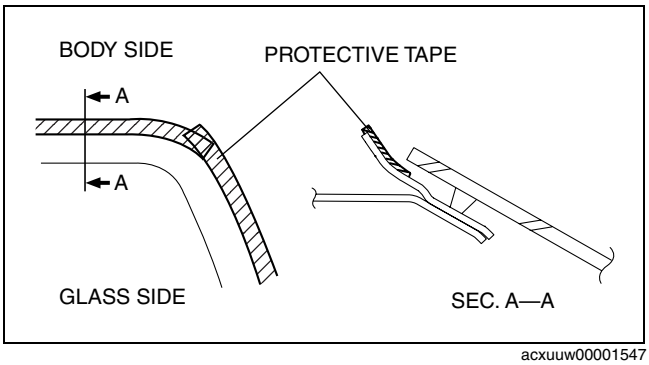
**Sealant hardening time: 24 h**

**REAR WINDOW GLASS REMOVAL**

id091200801500

1. Disconnect the negative battery cable.
2. Remove the rear wiper arm and blade. (See 09-19-9 REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
3. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
4. Remove the liftgate side trim. (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION)
5. Remove the liftgate lower trim. (See 09-17-26 LIFTGATE LOWER TRIM REMOVAL/INSTALLATION.)
6. Remove the rear wiper motor. (See 09-19-10 REAR WIPER MOTOR REMOVAL/INSTALLATION.)
7. Remove the rear spoiler. (See 09-16-12 REAR SPOILER REMOVAL/INSTALLATION.)
8. Remove the high-mount brake light. (See 09-18-12 HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION.)
9. Disconnect the filament connector.
10. Apply protective tape along the edge of the body.

**Note**
- Overlap and adhere the protective tape to the corners to prevent damage.

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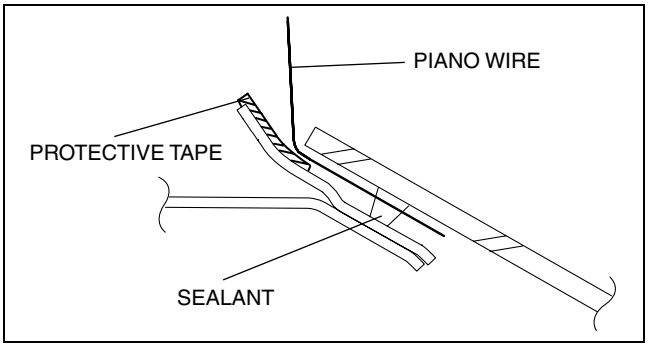
11. Insert the piano wire, which has been cut to sufficient length from inside the vehicle.

**Warning**
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

**Note**
- Before removing the rear window glass from the body, mark the position of the glass by affixing tape to the glass and body panel.



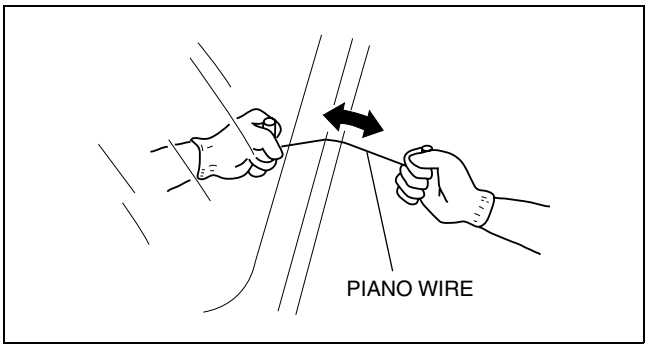

acxuuw00001551

12. Wind each end of the piano wire around a bar.

**Note**
- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking due to localized heating.

13. Secure one end of the piano wire, and while pulling the other end, cut the sealant around the rear window glass.
14. Remove the rear window glass.
15. Remove the fasteners from the rear window glass.

**Note**
- Place alignment marks on the rear window glass before removing the fasteners from the rear window glass.

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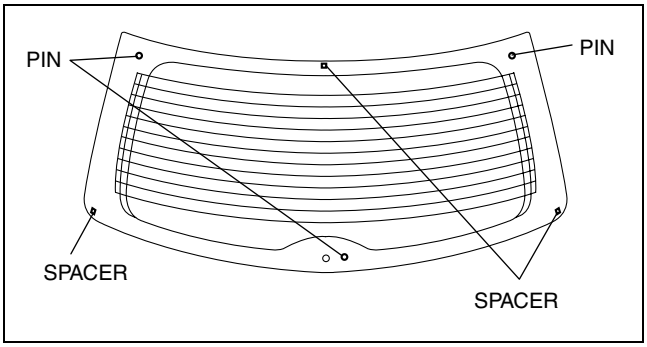
## REAR WINDOW GLASS INSTALLATION

id091200801600

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

**Caution**
- **If a door is opened or closed when all the window glass is closed, the resulting change in air pressure could cause the sealant to crack preventing the proper installation of the glass. Keep the door glass open until the rear window glass installation is completed.**

1. Remove the sealant along the perimeter of the glass using a razor or scraper. (when reusing the glass)
2. Clean and degrease an **approx. 50 mm {1.97 in}** wide strip along the perimeter of the glass.
3. Inspect the glass for cracks. If it is cracked, chamfer it using sandpaper.
4. Install the spacers and pin to the glass as shown in the figure.
   When reusing the glass, align with the alignment mark marked before removing.
5. Apply glass primer on the glass as shown in the figure then allow it to dry for **approx. 30 min.**

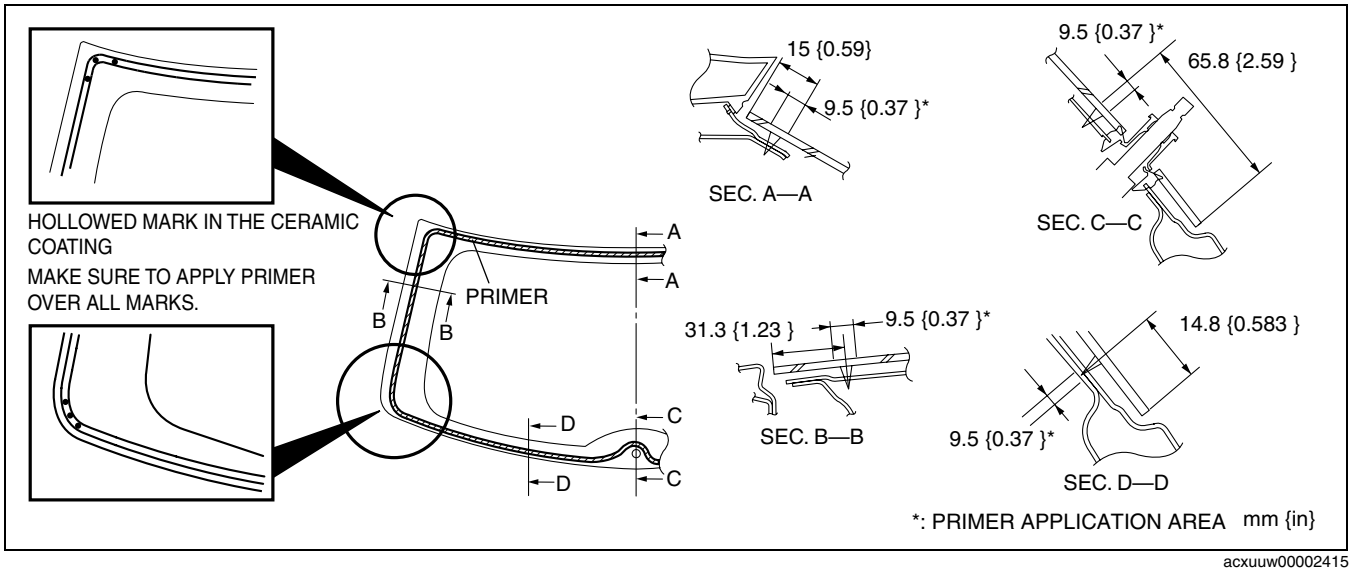



acxuuw00001554

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

**Note**
- Apply primer to the hollowed marks in the ceramic coating.



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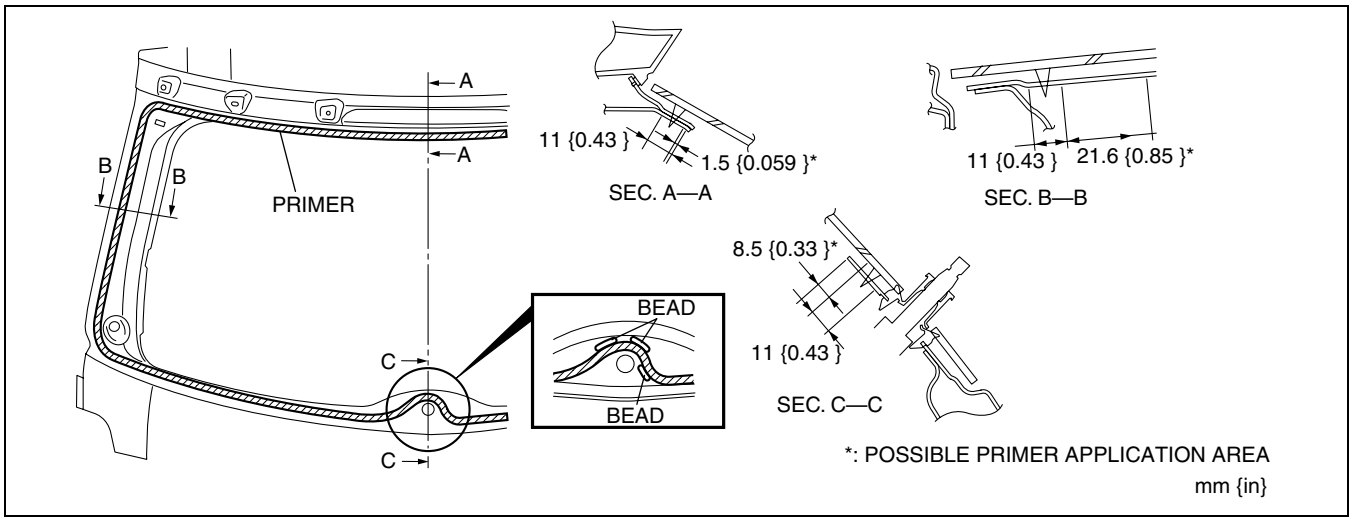
6. Cut away the old sealant using a razor or scraper so that **1— 2 mm {0.04— 0.07 in}** thickness of sealant remains along the perimeter of the frame.
7. Clean and degrease the bonding area along the perimeter of the body.
8. When reusing the liftgate, apply primer to the area where the sealant has come off completely and allow it to dry for **approx. 30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

9. Apply body primer on the body as shown in the figure, then allow it to dry for **30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

**Note**
- Apply primer to the hollowed marks in the ceramic coating.

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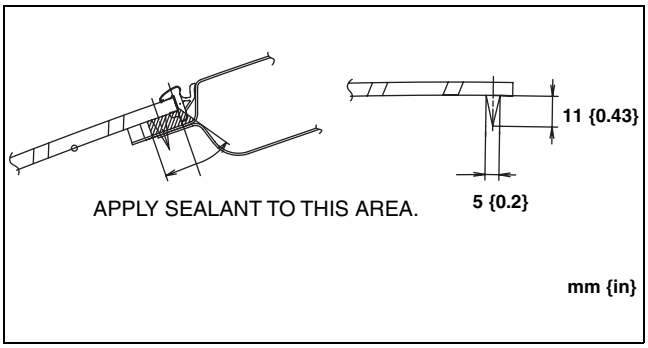
10. Apply sealant to the area of the glass surface as shown in the figure.
11. Install the rear window glass.
12. Verify that the gap at the upper and lower parts of the glass is within the standard value shown in the figure, then press along the perimeter of the glass.

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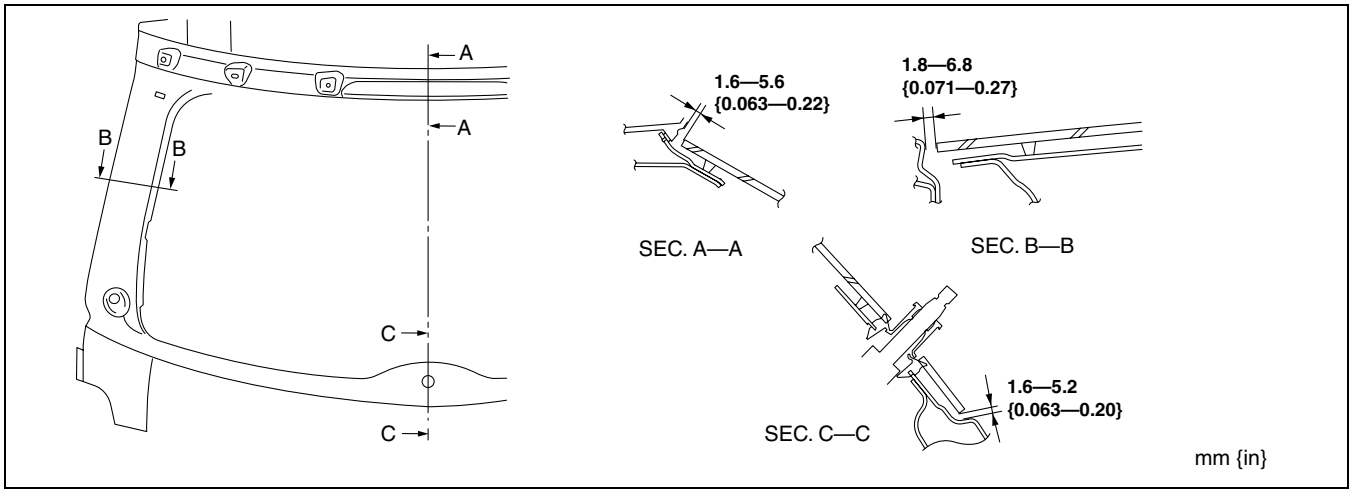


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13. Connect the filament connector.
14. Install the high-mount brake light. (See 09-18-12 HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION.)
15. Install the rear spoiler. (See 09-16-12 REAR SPOILER REMOVAL/INSTALLATION.)
16. Install the rear wiper motor. (See 09-19-10 REAR WIPER MOTOR REMOVAL/INSTALLATION .)
17. Install the liftgate lower trim. (See 09-17-26 LIFTGATE LOWER TRIM REMOVAL/INSTALLATION.)

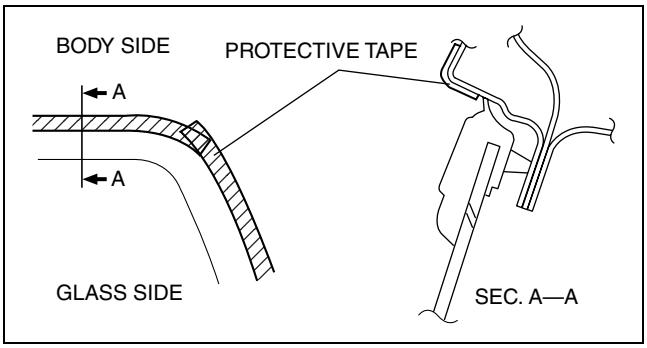
18. Install the liftgate side trim. (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION.)
19. Install the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
20. Install the rear wiper arm and blade. (See 09-19-9 REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION .)
21. Allow the sealant to harden completely.

    **Sealant hardening time: 24 h**

### SIDE WINDOW GLASS REMOVAL

id091200803800

1. Remove the A-pillar lower trim. (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
2. Remove the A-pillar trim. (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Apply protective tape along the edge of the body and the side window glass.

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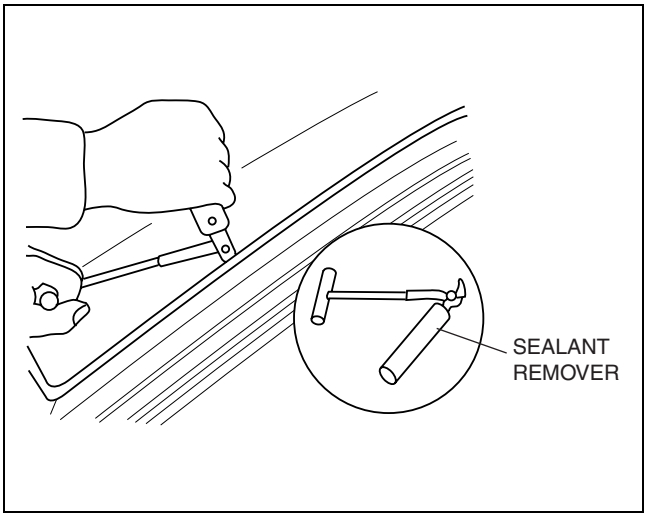
#### Not Reusing Windshield

**Note**
- For the areas of the sealant that are difficult to cut, use the piano wire and follow the procedure under “Reusing Windshield”.

1. Cut out the sealant all around the glass from inside the vehicle using a sealant remover.

   **Warning**
   - **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Remove the side window glass.



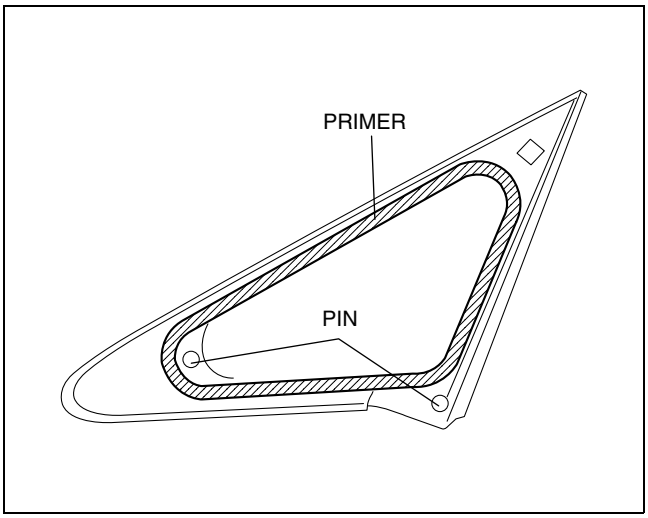

acxuuw00001579

**Reusing Windshield**

**Warning**
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

1. Avoiding the pin on the inside of the vehicle, insert the piano wire which has been cut to sufficient length.
2. Wind each end of the piano wire around a bar.

**Note**
- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking due to localized heating.



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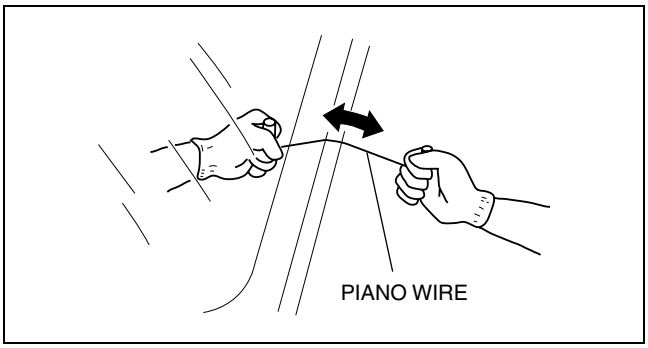
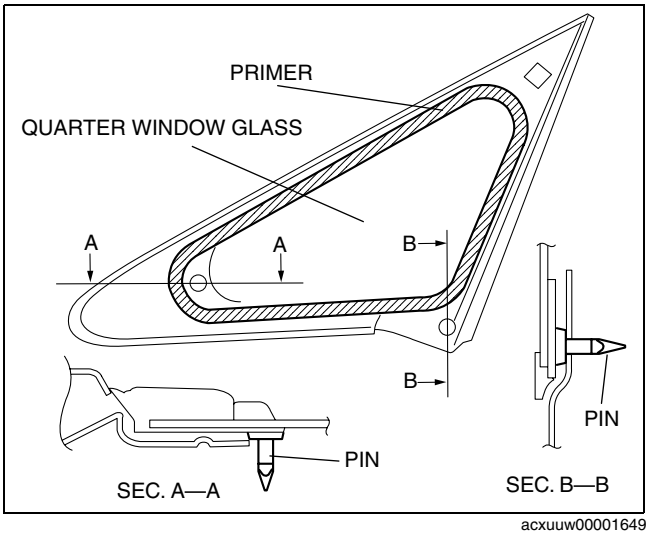
3. Secure one end of the piano wire, and while pulling the other end, cut the sealant around the side window glass.



acxuuw00001945

4. Pull the side window glass outward and detach the pins from the body.
5. If a pin or spacer is damaged, remove it.

**Note**
- Before removing the pins or spacers from the quarter window glass, place alignment marks on the side window glass.



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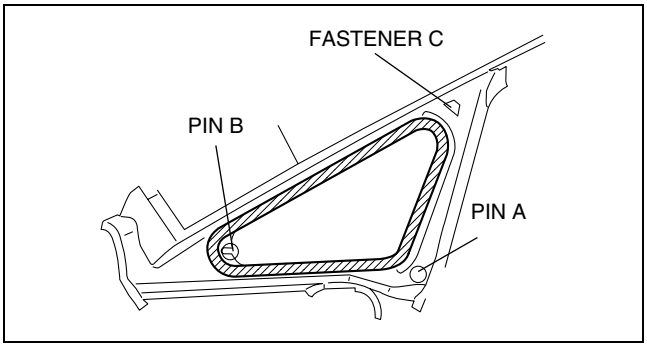
## SIDE WINDOW GLASS INSTALLATION

id091200803900

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

**Caution**
- **If a door is opened or closed when all the window glass is closed, the resulting change in air pressure could cause the sealant to crack preventing the proper installation of the glass. Keep the door glass open until the side window glass installation is completed.**

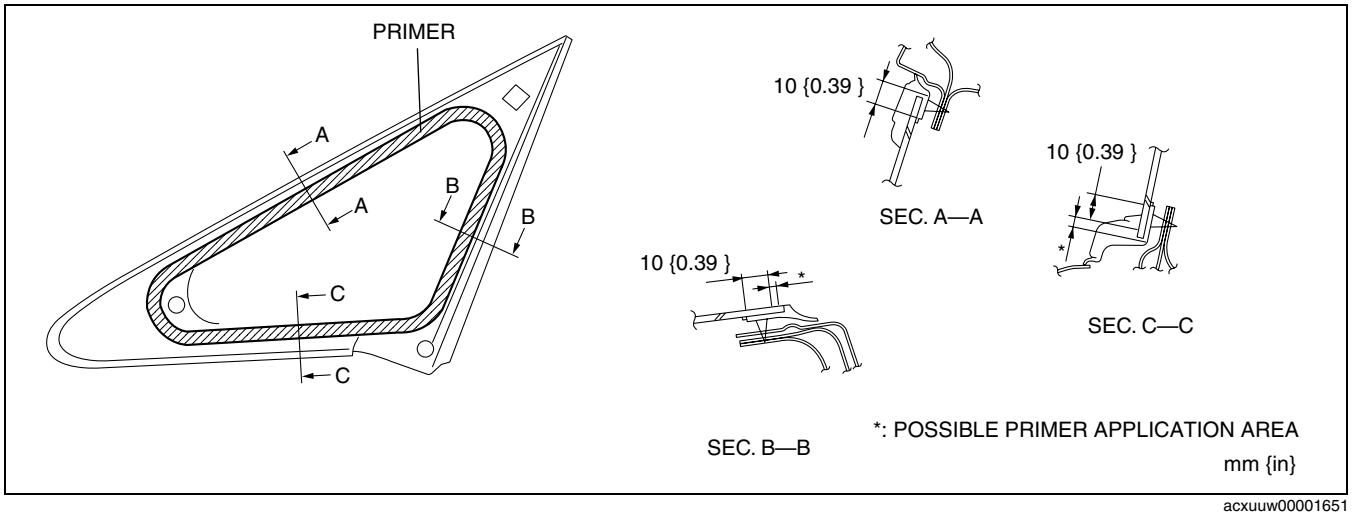
1. Remove sealant along the perimeter of the glass using a razor or scraper. (when reusing the glass)
2. Clean and degrease the ceramic part along the perimeter of the glass.
3. Inspect the glass for cracks. If it is cracked, chamfer it using sandpaper.
4. Press pin A until it locks, then press pin B and fastener C simultaneously until they lock as shown in the figure.
   Align with the alignment marks marked before removing the glass.
5. Apply glass primer along the hollowed marks in the ceramic coating on the new glass, along the sealant tracks on the reused glass, then allow it to dry for **approx. 30 min.**



acxuuw00001650

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

**Note**
- Apply primer to the hollowed marks in the ceramic coating.



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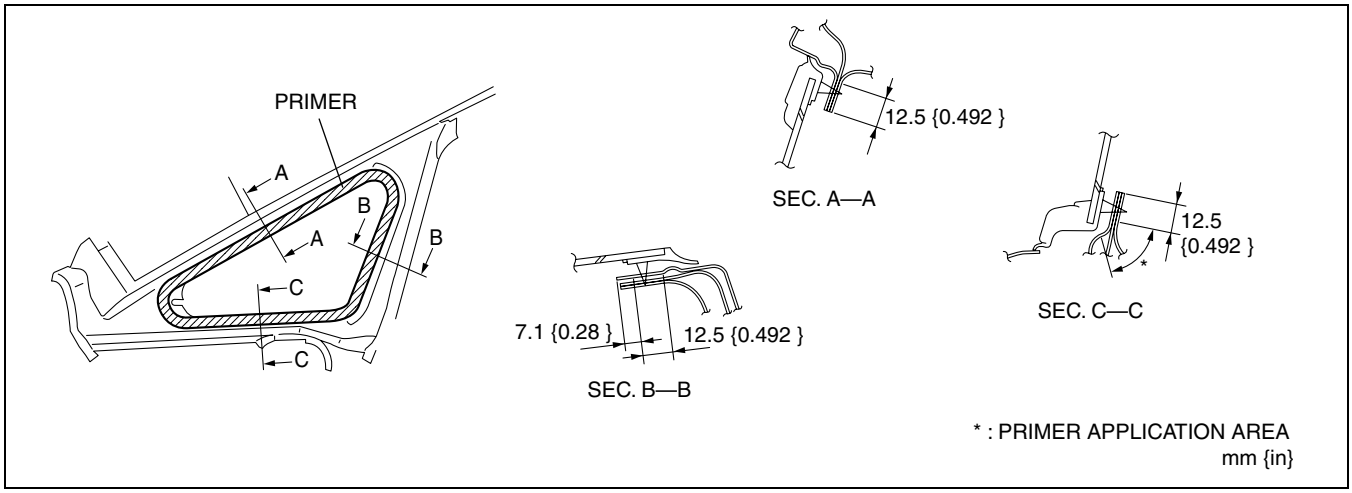
6. Cut away the old sealant using a razor or scraper so that **1— 2 mm {0.04— 0.079 in}** thickness of sealant remains along the perimeter of the frame.
7. If the sealant has come off completely in any one place, apply some primer after degreasing, and allow it **approx. 30 min** to dry. Then apply **2 mm {0.079 in}** thickness of new sealant.
8. Clean and degrease the bonding surface along the perimeter of the body.

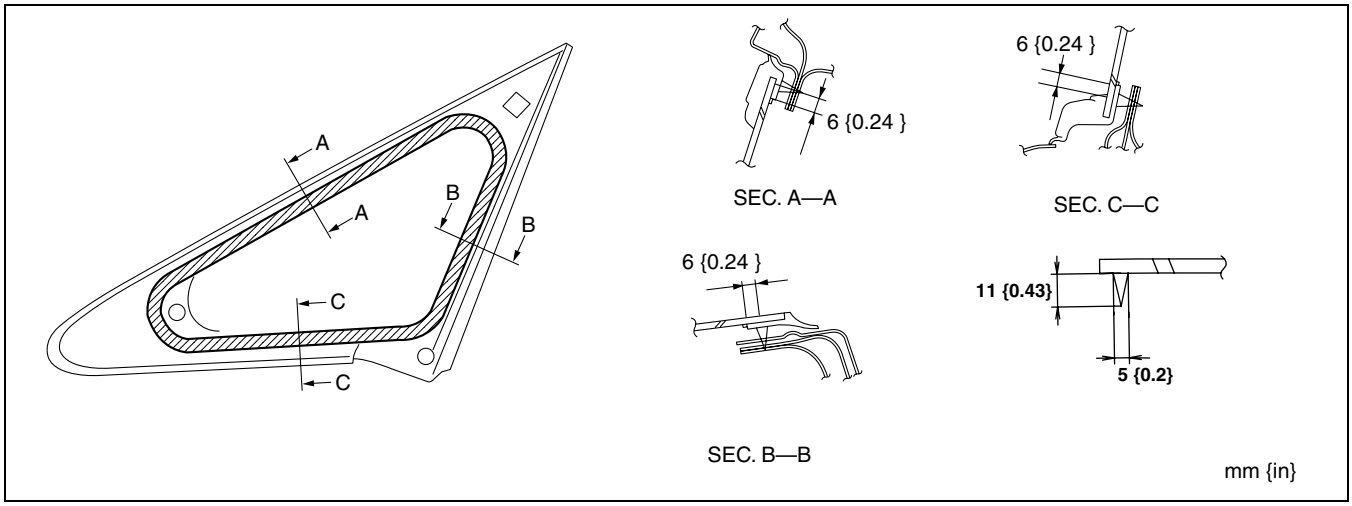
9. Apply body primer on the body as shown in the figure, then allow it to dry for **approx. 30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**




acxuuw00001652

10. After the primer has dried, apply **11 mm {0.43 in}** in thickness, **5 mm {0.20 in}** in width of sealant using a sealant gun. Where it is not applied properly, correctly apply it using a spatula.

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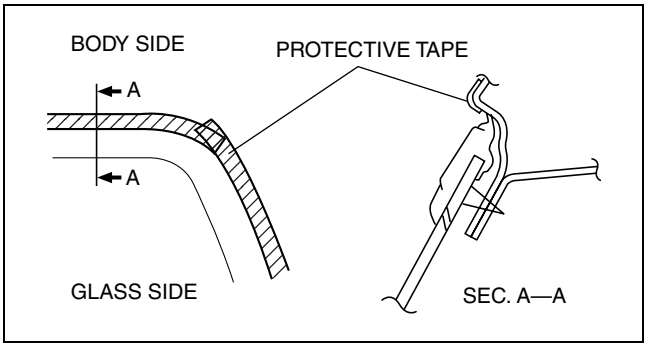
11. Insert the positioning pins to the body and install the side window glass.
12. Install the A-pillar trim. (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
13. Install the A-pillar lower trim. (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
14. Allow the sealant to harden completely.

**Sealant hardening time: 24 h**

## QUARTER WINDOW GLASS REMOVAL

id091200801700

1. Remove the following parts:
   (1) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (6) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (7) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
2. Set the headliner out of the way.
3. Apply protective tape along the edge of the body and the quarter window glass.




acxuuw00001577

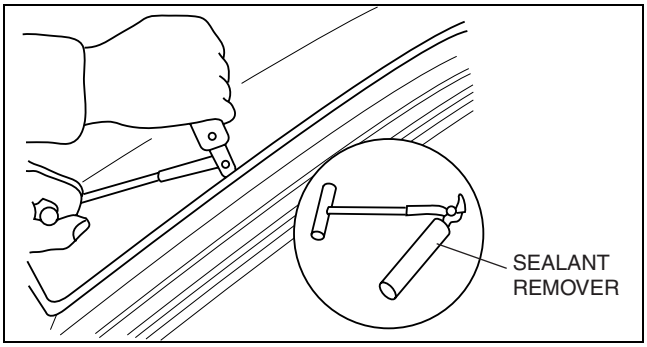
### Not Reusing Windshield

**Note**
- For the areas of the sealant that are difficult to cut, use the piano wire and follow the procedure under “Reusing Windshield”.

1. Cut out the sealant all around the glass from inside the vehicle using a sealant remover.

   **Warning**
   - **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Remove the quarter window glass.



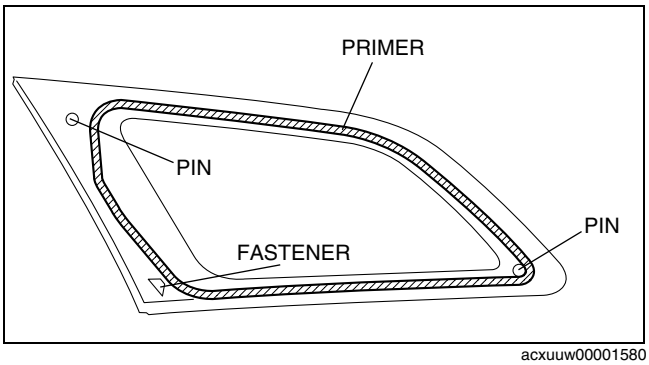

acxuuw00001579

**Reusing Windshield**

**Warning**

- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

1. Avoiding the pin on the inside of the vehicle, insert the piano wire which has been cut to sufficient length.

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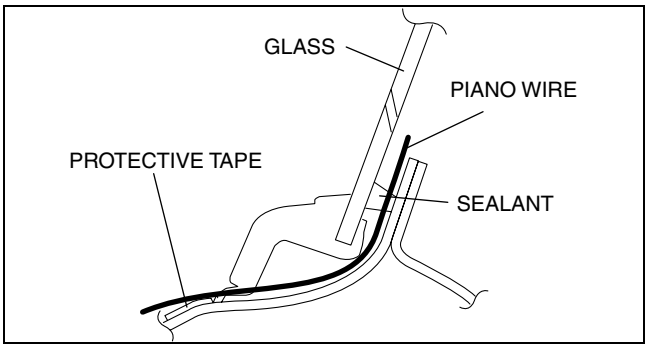


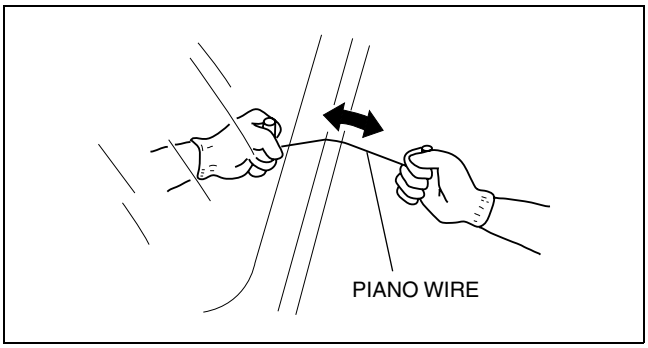

acxuuw00001581

2. Wind each end of the piano wire around a bar.

**Note**

- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking due to localized heating.

3. Secure one end of the piano wire, and while pulling the other end, cut the sealant around the quarter window glass.

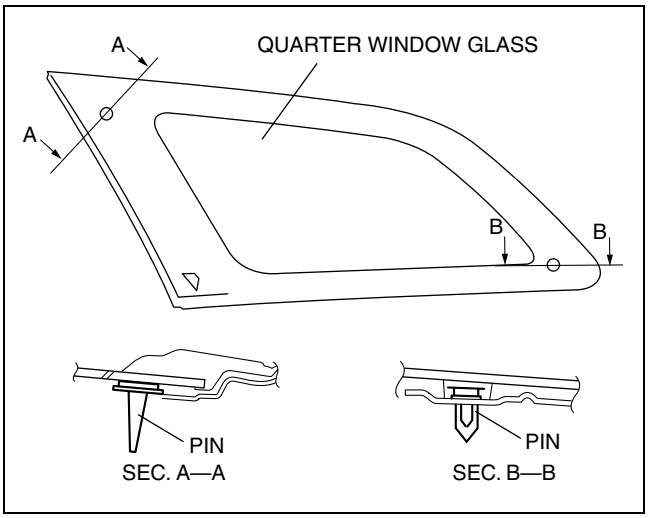



acxuuw00001578

4. Pull the quarter window glass outward and detach the pins from the body.
5. If a pin or spacer is damaged, remove it.

**Note**

- Before removing the pins or spacers from the quarter window glass, place alignment marks on the quarter window glass.

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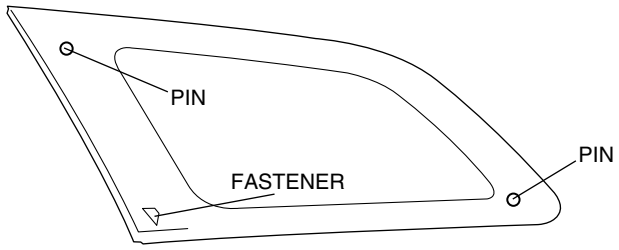
## QUARTER WINDOW GLASS INSTALLATION

id091200801800

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

**Caution**
- **If a door is opened or closed when all the window glass is closed, the resulting change in air pressure could cause the sealant to crack preventing the proper installation of the glass. Keep the door glass open until the quarter window glass installation is completed.**

1. Remove sealant along the perimeter of the glass using a razor or scraper. (when reusing the glass)
2. Clean and degrease the ceramic part along the perimeter of the glass.
3. Inspect the glass for cracks. If it is cracked, chamfer it using sandpaper.
4. If the glass is reused, attach the pins and fastener to the glass as shown in the figure.
   Align with the alignment marks marked before removing the glass.

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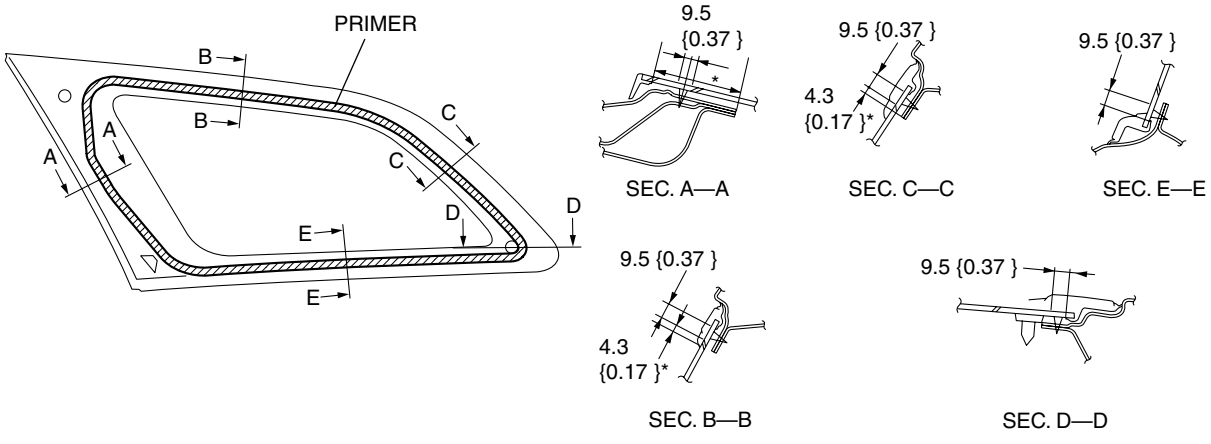
5. Apply glass primer along the hollowed marks in the ceramic coating on the new glass, along the sealant tracks on the reused glass, then allow it to dry for **approx. 30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

**Note**
- Apply primer to the hollowed marks in the ceramic coating.

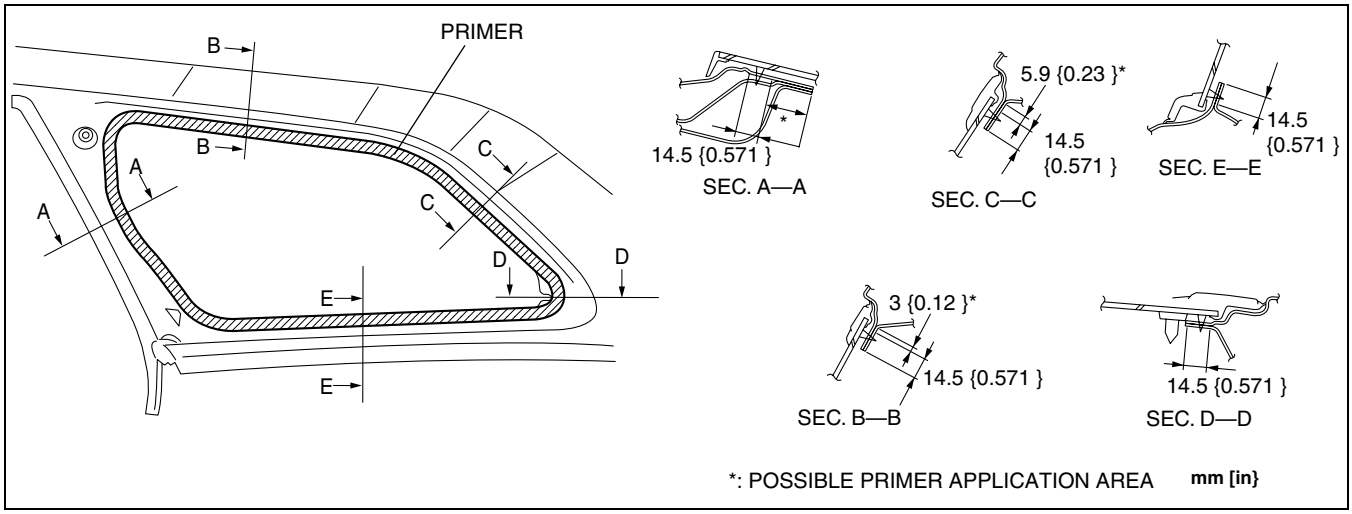



acxuuw00001624

6. Cut away the old sealant using a razor or scraper so that **1— 2 mm {0.04— 0.079 in}** thickness of sealant remains along the perimeter of the frame.
7. If the sealant has come off completely in any one place, apply some primer after degreasing, and allow it **approx. 30 min** to dry. Then apply **2 mm {0.079 in}** thickness of new sealant.
8. Clean and degrease the bonding surface along the perimeter of the body.

9. Apply body primer on the body as shown in the figure, then allow it to dry for **approx. 30 min.**

**Caution**
- **To prevent weakening of the primer adhesion, keep the bonding surface free of dirt, moisture, and grease. Do not touch the surface with your hand.**

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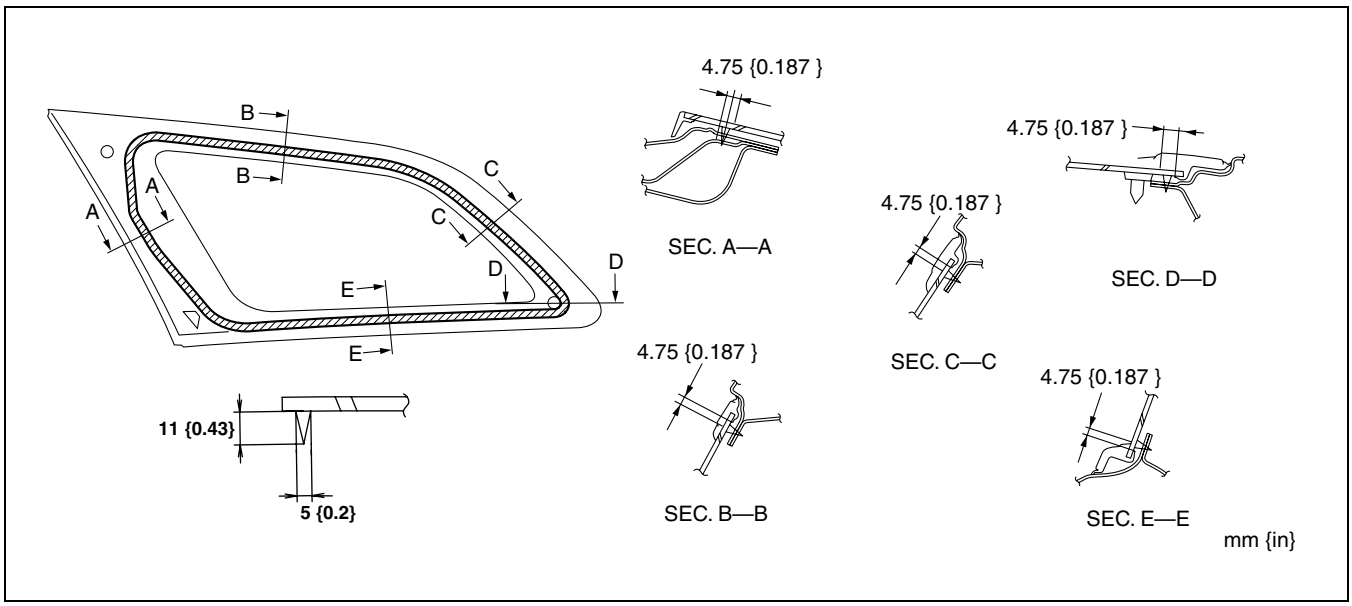
10. After the primer has dried, apply **11 mm {0.43 in}** in thickness, **5 mm {0.20 in}** in width of sealant using a sealant gun. Where it is not applied properly, correctly apply it using a spatula.




acxuuw00001626

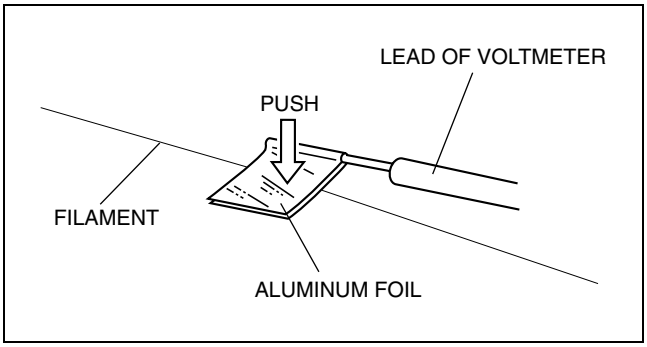
11. Insert the positioning pins to the body and install the quarter window glass.
12. Install the following parts:
    (1) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
    (2) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
    (3) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
    (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
    (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
    (6) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
    (7) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
    (8) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
13. Allow the sealant to harden completely.

**Sealant hardening time: 24 h**

## FILAMENT INSPECTION

id091200801000

1. Turn the ignition switch to the ON position.
2. Turn the rear window defroster switch on.
   **Caution**
   - **Directly touching the rear window defroster filament with the lead of the tester could damage it. Wrap aluminum foil around the end of the lead and inspect the filament by touching it with the foil.**
3. Connect the positive lead of the tester to the positive side of each filament and the negative lead to ground.

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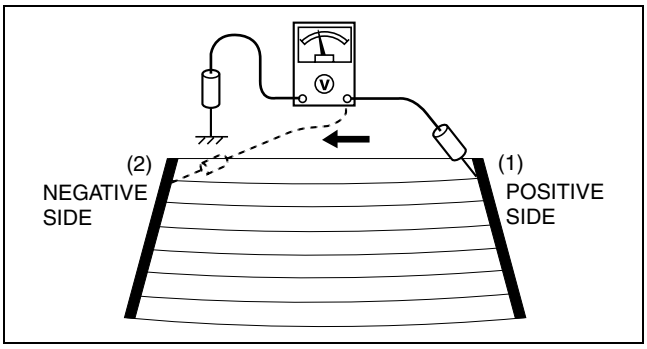
4. Gradually slide the positive lead from the positive side to the negative side and verify that the voltage decreases accordingly.
   - If the voltage changes rapidly, the filament has a malfunction. Repair the filament.

| Measured part | Voltage (Reference) |
|---|---|
| (1) to (2) | Approx. 11 V to 0 V |

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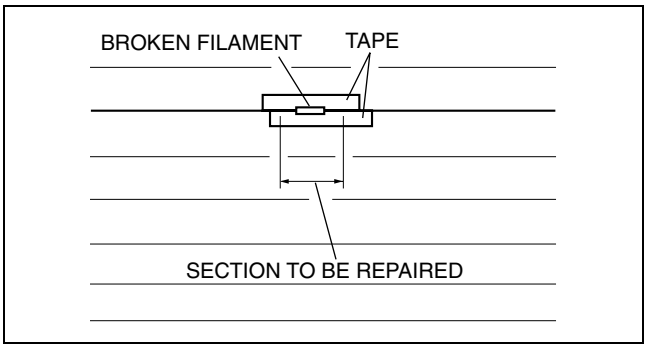
## FILAMENT REPAIR

id091200801100

1. Clean the filament using isopropyl alcohol.
2. Attach tape to both sides of the filament.
3. Using a small brush or marking pen, apply silver paint.
4. After **2— 3 min,** carefully remove the tape without damaging the applied area.
   **Caution**
   - **Do not operate the rear window defroster until the paint is completely dry. It may cause other malfunctions if it is used before the paint is dry.**
5. Dry the repaired part according to the following procedure.
   - When the room temperature is **25 °C {77 °F} ,** leave it as it is for **24 h.**
   - When a hot air blower is used, dry with the **150 °C {302 °F}** air for **30 min.**

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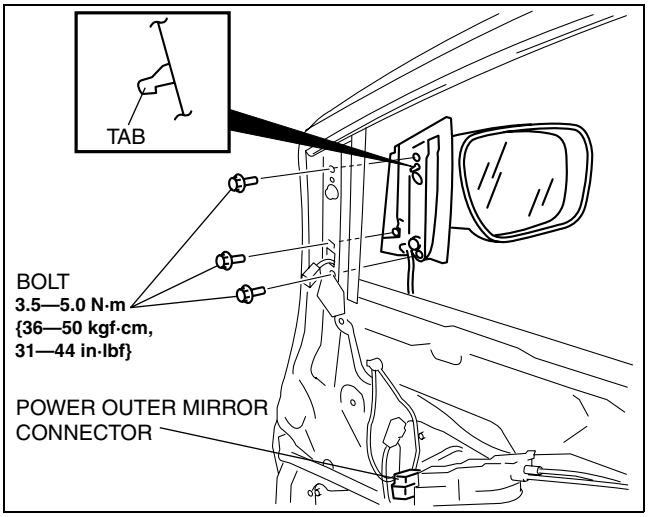
## POWER OUTER MIRROR REMOVAL/INSTALLATION

id091200802500

1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
4. Disconnect the power outer mirror connector.
5. Remove the bolts.
6. Push the power outer mirror against the vehicle and detach the tab while lifting the mirror up to remove.
7. Install in the reverse order of removal.

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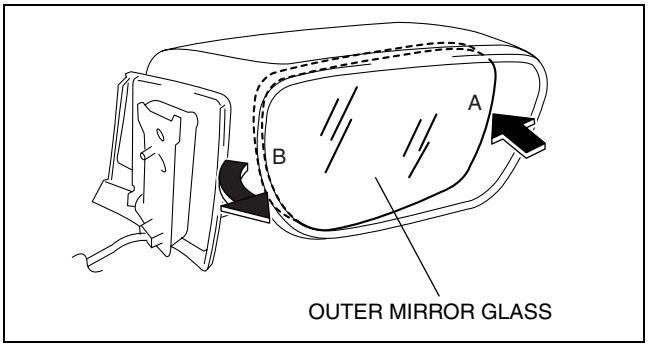
## OUTER MIRROR GLASS REMOVAL

id091200802600

1. Press area A of the mirror glass so that area B moves outward.

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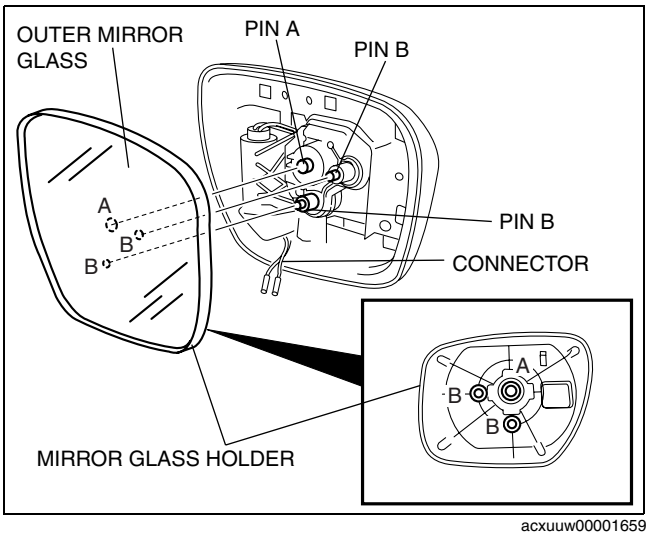
2. Detach pin A while lifting up the inside of the mirror glass holder.
3. Pull the mirror glass holder and remove pins B.
4. Disconnect the connectors. (vehicles with heated outer mirrors)
5. Remove the mirror glass holder and the outer mirror glass as a single unit.

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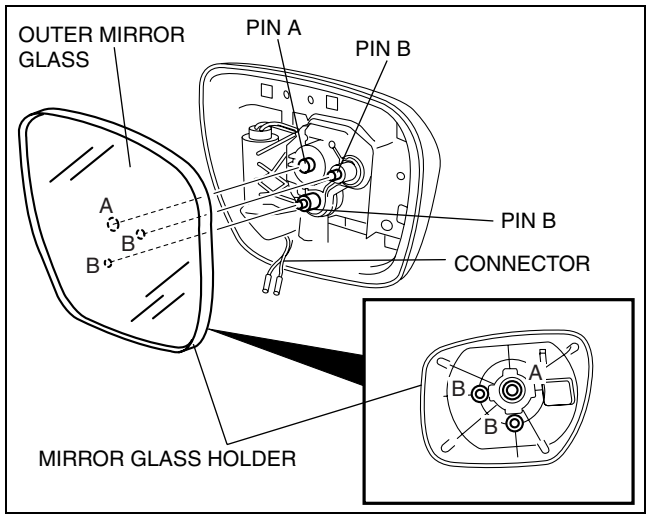
### OUTER MIRROR GLASS INSTALLATION

id091200802700

1. Connect the connectors. (vehicles with heated outer mirrors)
2. Press part A on the outer mirror glass and install pin A
3. Press part B on the outer mirror glass and install pins B.

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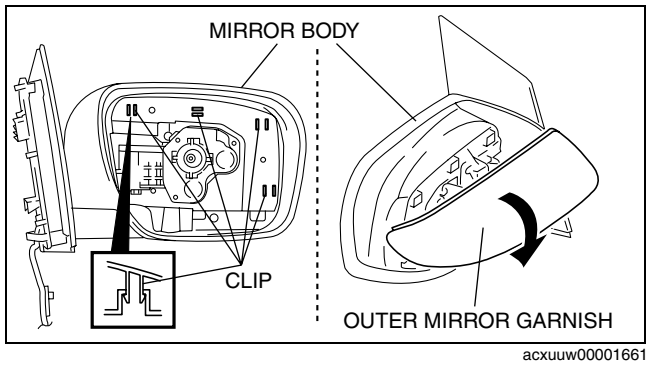
### OUTER MIRROR GARNISH REMOVAL

id091200802800

1. Remove the outer mirror glass from the outer mirror. (See 09-12-32 OUTER MIRROR GLASS REMOVAL.)
2. Pinch the clip ends using pincers and detach the clips by pushing them forward.
3. Grasp the upper side of the outer mirror garnish and remove it by pulling it in the direction of the arrow.

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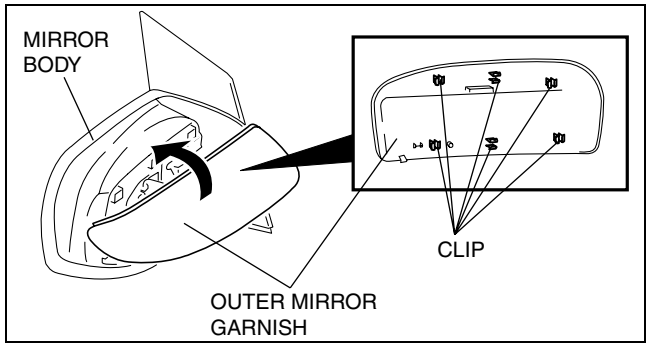
### OUTER MIRROR GARNISH INSTALLATION

id091200802900

1. Position the outer mirror garnish against the mirror body in the direction of the arrow shown in the figure, and insert the outer mirror garnish clips (6 locations) into the mirror body.
2. Install the outer mirror garnish so that there are no gaps around the component.

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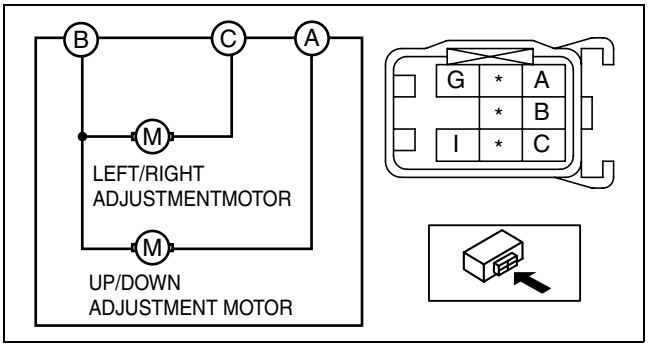
## POWER OUTER MIRROR INSPECTION

id091200803000

1. Apply battery positive voltage to the power outer mirror terminals and inspect the operation of the power outer mirror.
   - If not as specified, replace the power outer mirror.

| Mirror operation | terminal | |
|---|---|---|
| | B+ | GND |
| Up | A | B |
| Down | B | A |
| Left | C | B |
| Right | B | C |

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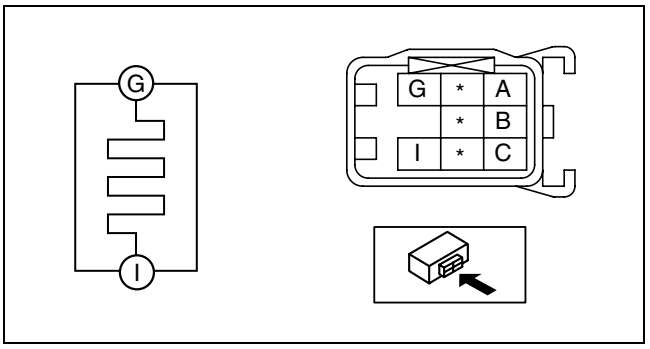
2. Inspect for continuity between the power outer mirror heater terminals.
   - If not as specified, replace the power outer mirror.

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○—○ : Continuity

| Mirror operation | Terminal | |
|---|---|---|
| | G | I |
| Heater | ○ | ○ |

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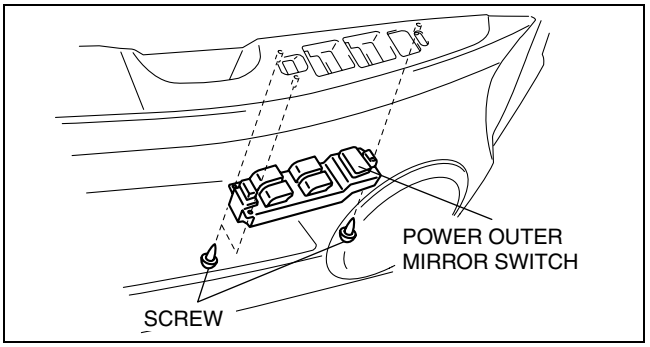
## POWER OUTER MIRROR SWITCH REMOVAL/INSTALLATION

id091200802300

**Note**
- The power outer mirror switch is integrated with the power window main switch.

1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION)
4. Disconnect the power door mirror switch connector and the power window main switch connector.
5. Remove the screws, then the power outer mirror switch.
6. Install in the reverse order of removal.

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## POWER OUTER MIRROR SWITCH INSPECTION

id091200802400

1. Inspect for continuity between the power outer mirror switch terminals using an ohmmeter.
   - If not as indicated in the table, replace the power outer mirror switch.

: Continuity

| OPERATION | | 3D | 3F | 3G | 3H | 3B | 1C | 1M |
|---|---|---|---|---|---|---|---|---|
| LH | UP | ○ | | | | ○ | ○ | ○ |
| | DOWN | ○ | | | | ○ | ○ | ○ |
| | LEFT | | | ○ | | ○ | ○ | ○ |
| | RIGHT | | | ○ | | ○ | ○ | ○ |
| RH | UP | | ○ | | | ○ | ○ | ○ |
| | DOWN | | ○ | | | ○ | ○ | ○ |
| | LEFT | | | | ○ | ○ | ○ | ○ |
| | RIGHT | | | | ○ | ○ | ○ | ○ |

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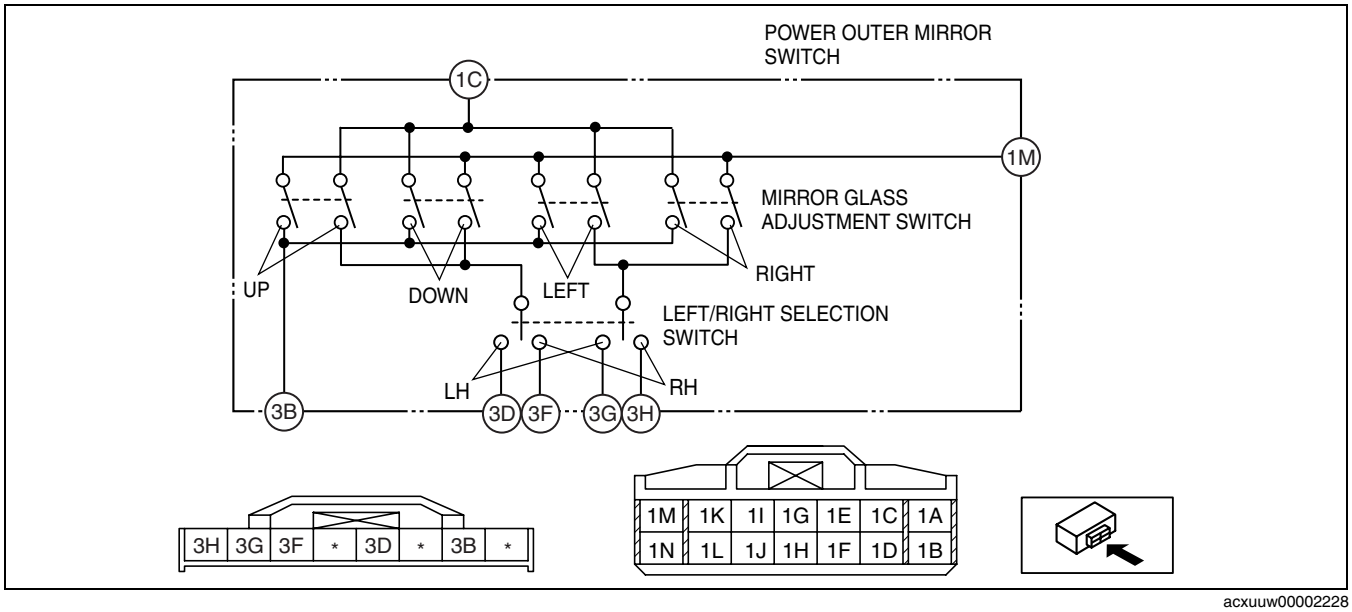


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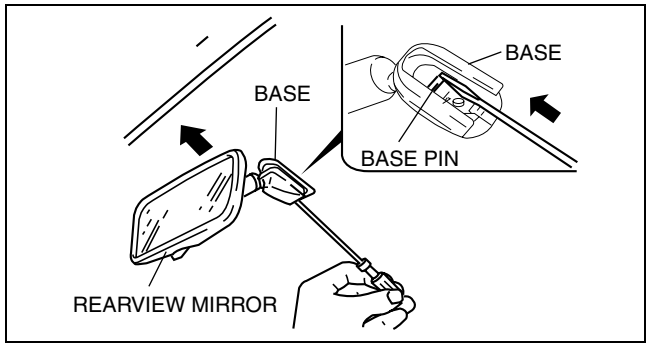
## REARVIEW MIRROR REMOVAL

id091200806800

1. Insert a flathead screwdriver between the mirror and the base.
2. Push the base pin down to remove the rearview mirror.

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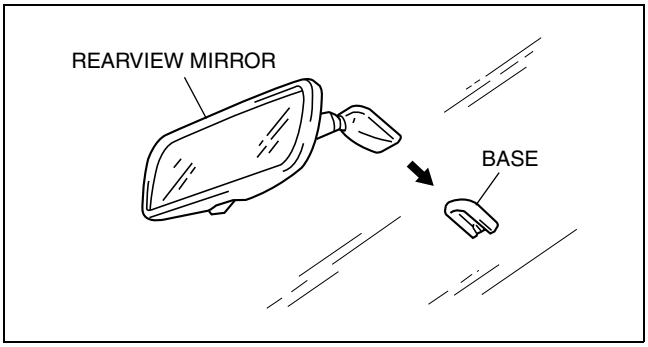
### REARVIEW MIRROR INSTALLATION

id091200806700

1. Install the rearview mirror onto the base.

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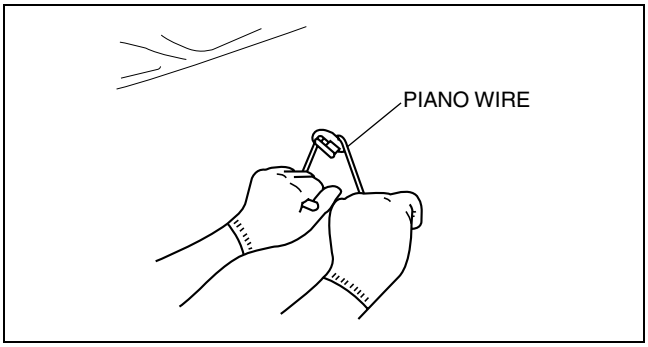
### BASE REMOVAL

id091200803200

1. Remove the rearview mirror. (See 09-12-35 REARVIEW MIRROR REMOVAL.)
2. Wind each end of a wire around a bar.

**Warning**
- **Using the piano wire with bare hands can cause injury. Always wear gloves when using the piano wire.**

**Note**
- Use a long sawing action to spread the work over the whole length of the piano wire to prevent it from breaking.

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3. Fix one end of the piano wire, and while pulling the other end, cut the sealant to remove the base.

### BASE INSTALLATION

id091200803300

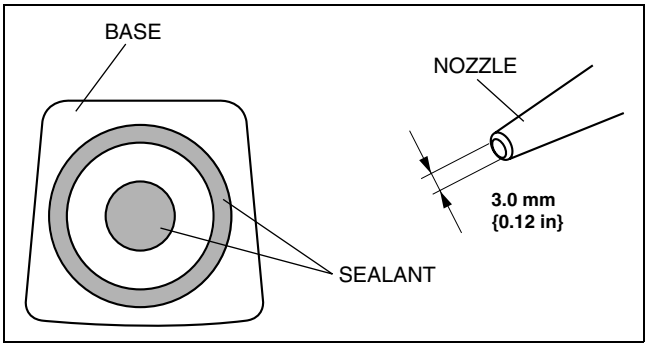
1. Cut away all of the original sealant using a razor.

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

2. Clean and degrease the ceramic coating on the glass and the base.

**Caution**
- **Keep the area free of dirt and grease, and do not touch the surface. Otherwise, the primer may not properly bond to the surface of the glass.**

3. Apply primer to the bonding area of the glass and the base.
4. Use only glass primer on the glass, and body primer on the base. Allow the primer to dry for **approx. 30 min.**
5. Apply **3.0 mm {0.12 in}** layer of sealant to the base.

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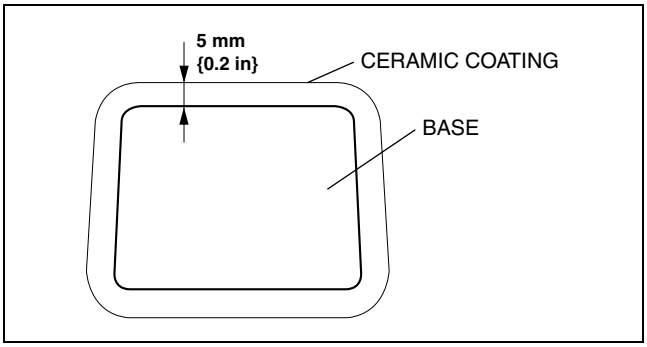
6. Center the base in the ceramic coating and press it onto the glass.
7. Use isopropyl alcohol to remove any excess repair sealant.

**Hardening time of sealant**

| Temperature | Surface hardening time | Time required until car can be put into service |
|---|---|---|
| 5 °C {41 °F} | Approx. 1.5 h | Approx. 12 h |
| 20 °C {68 °F} | Approx. 1 h | Approx. 4 h |
| 35 °C {95 °F} | Approx. 10 min | Approx. 2 h |



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8. Install the rearview mirror.

# 09-13 SEATS

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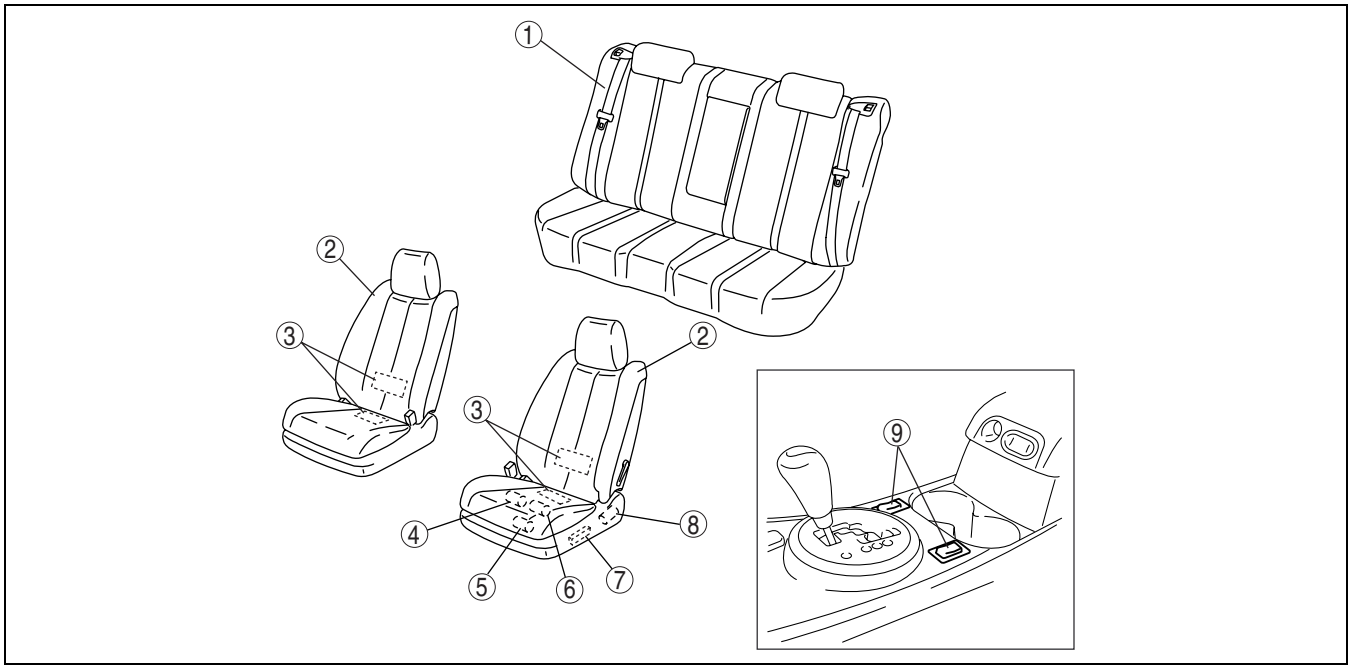


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| | |
|---|---|
| 1 | Rear seat<br>(See 09-13-7 REAR SEAT REMOVAL/ INSTALLATION.)<br>(See 09-13-8 REAR SEAT DISASSEMBLY/ ASSEMBLY.) |
| 2 | Front seat<br>(See 09-13-2 FRONT SEAT REMOVAL/ INSTALLATION.)<br>(See 09-13-2 FRONT SEAT DISASSEMBLY/ ASSEMBLY.) |
| 3 | Seat warmer unit<br>(See 09-13-12 SEAT WARMER UNIT INSPECTION.) |
| 4 | Rear tilt motor<br>(See 09-13-9 REAR TILT MOTOR INSPECTION.) |

| | |
|---|---|
| 5 | Slide motor<br>(See 09-13-10 SLIDE MOTOR INSPECTION.) |
| 6 | Front tilt motor<br>(See 09-13-9 FRONT TILT MOTOR INSPECTION.) |
| 7 | Power seat switch<br>(See 09-13-11 POWER SEAT SWITCH INSPECTION.) |
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| 9 | Seat warmer switch<br>(See 09-13-11 SEAT WARMER SWITCH REMOVAL/INSTALLATION.)<br>(See 09-13-12 SEAT WARMER SWITCH INSPECTION.) |

## FRONT SEAT REMOVAL/INSTALLATION

id091300800200

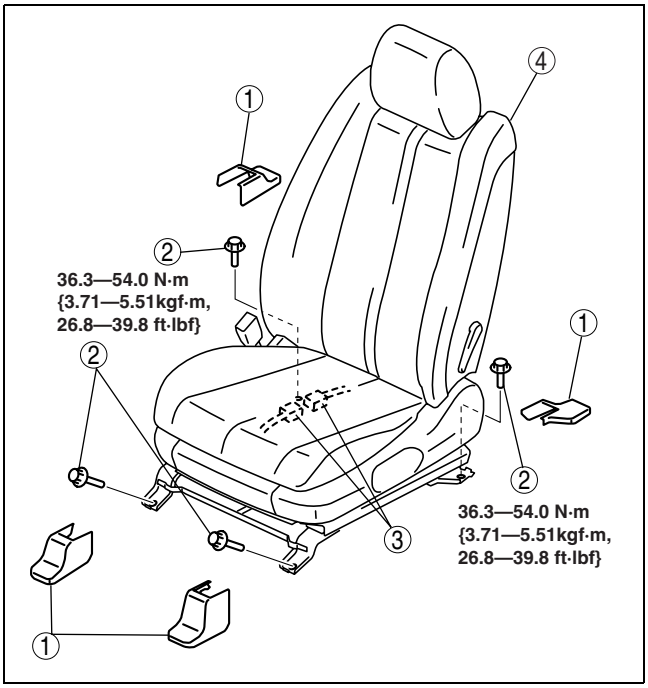
**Warning**
- **Handling the front seats improperly can accidentally deploy the side air bag, which may seriously injure you. Read air bag system service warnings and cautions before handling the front seats. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

**Caution**
- **When the passenger's seat is removed, perform the seat weight sensor inspection using the M-MDS after installing the passenger's seat. (See 08-10-12 SEAT WEIGHT SENSOR INSPECTION.)**
- **When the passenger's seat is replaced with a new one, perform the seat weight sensor calibration using the M-MDS. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)**

1. Turn the ignition switch to the LOCK position.
2. Disconnect the negative battery cable and wait for **more than 1 minute**.
3. Remove the seat belt anchor (passenger's side). (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Cover |
| 2 | Bolt |
| 3 | Connector |
| 4 | Front seat |

5. Install in the reverse order of removal.

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## FRONT SEAT DISASSEMBLY/ASSEMBLY

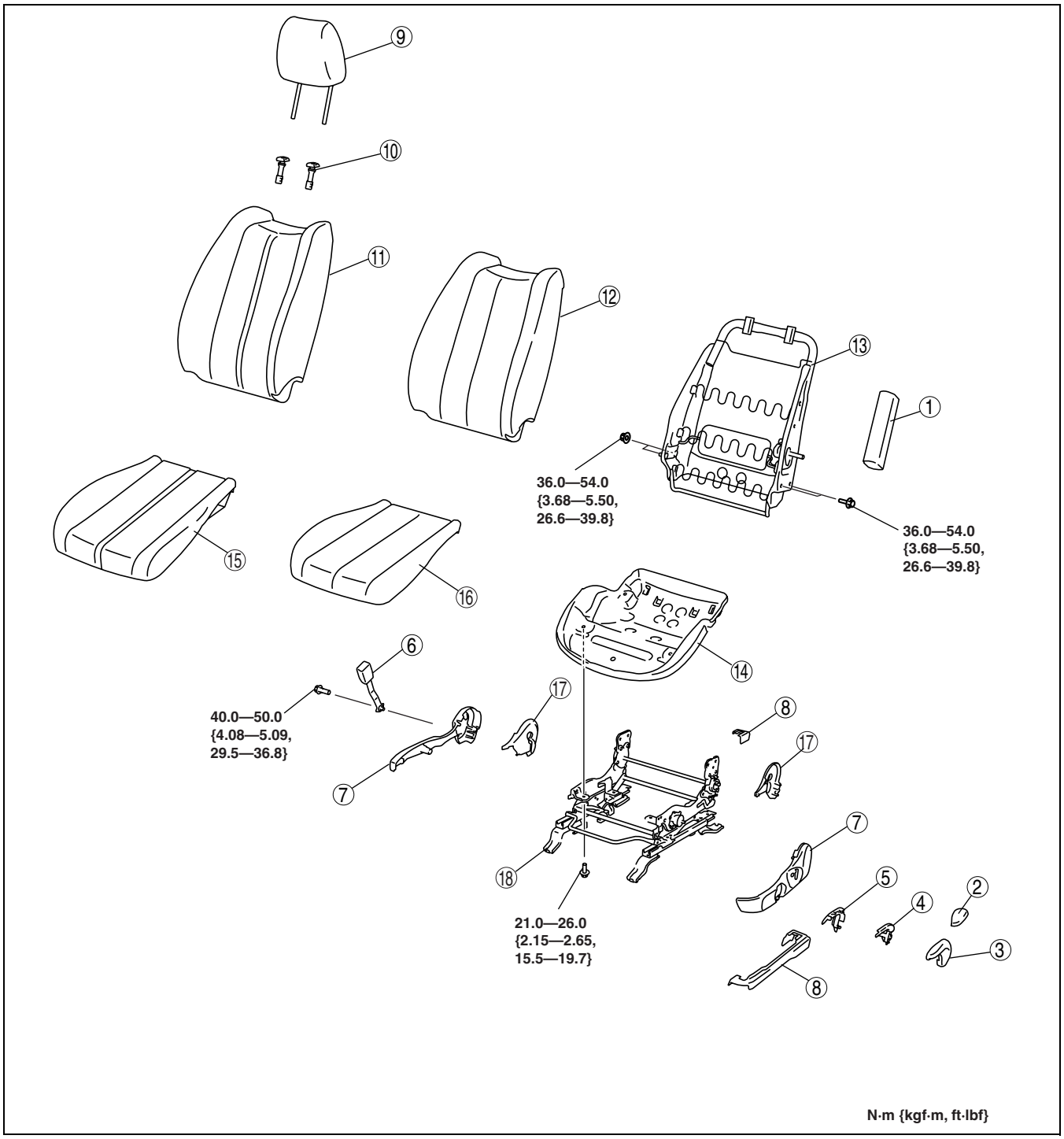
id091300800300

**Warning**
- **Handling the front seats improperly can accidentally deploy the side air bag, which may seriously injure you. Read AIR BAG SYSTEM SERVICE WARNINGS before handling the front seats. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

**Caution**
- **If any of the following work is performed, perform the seat weight sensor calibration using the M-MDS. (See 08-10-12 SEAT WEIGHT SENSOR CALIBRATION.)**
  - **— Replacement with a new seat weight sensor**
  - **— Replacement with a new seat weight sensor control module**
  - **— Replacement with new passenger's side parts**
  - **— Disassembly of the passenger's side**
- **If any of the following work is performed, perform the seat weight sensor inspection using the M-MDS. (See 08-10-12 SEAT WEIGHT SENSOR INSPECTION.)**
  - **— Removal of the passenger's side**
  - **— Loosening and retightening of passenger's seat fixing bolts**

1. Disconnect the negative battery cable and wait for **more than 1 minute**.
2. Disassemble in the order indicated in the table.
3. Assemble in the reverse order of disassembly.

**Driver's Seat (Manual Seat)**

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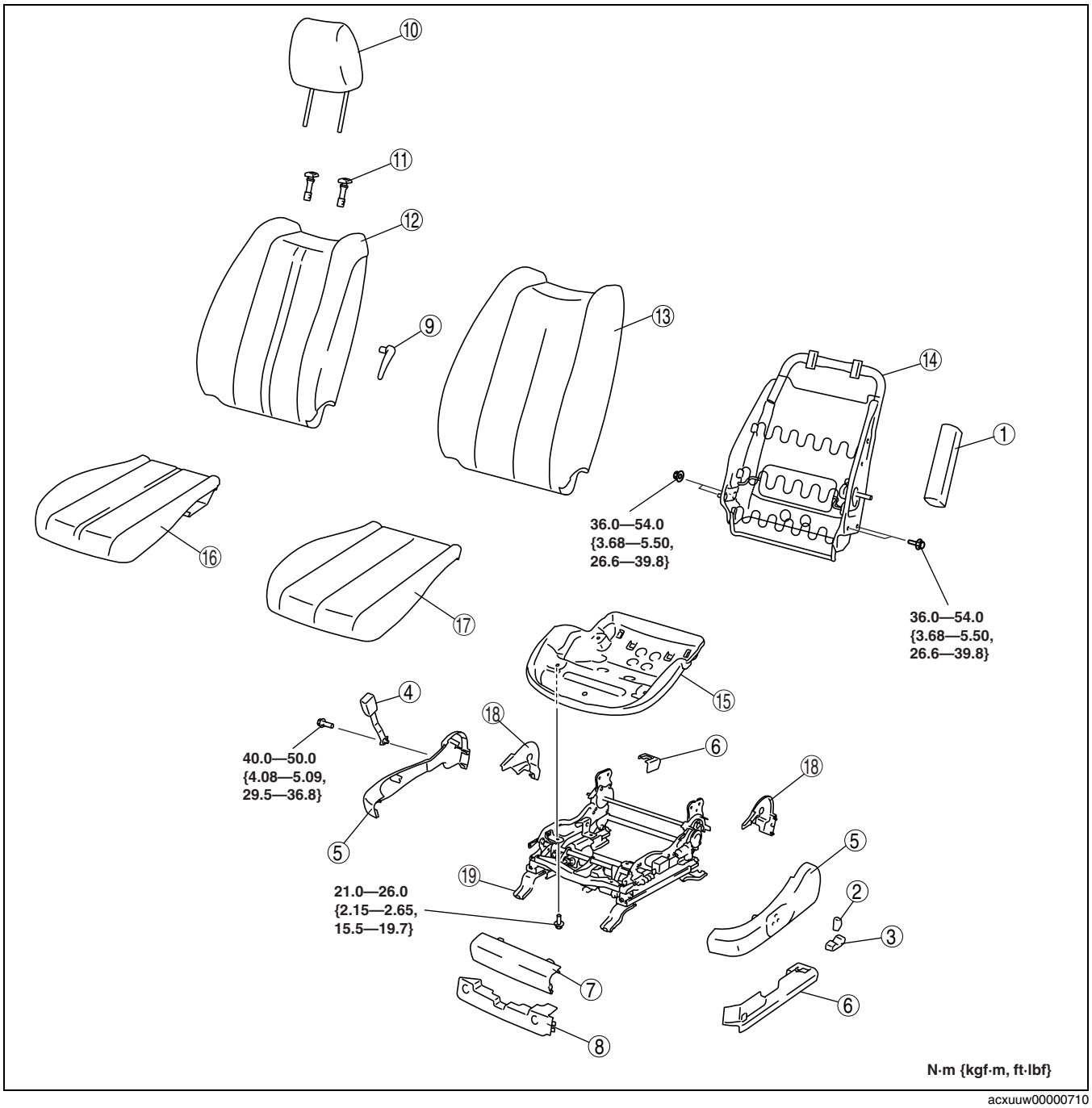
| | |
|---|---|
| 1 | Side air bag module<br>(See 08-10-8 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.) |
| 2 | Recliner lever |
| 3 | Outer lift cover |
| 4 | Lift lever |
| 5 | Inner lift cover |
| 6 | Front buckle |
| 7 | Side cover |
| 8 | Rail cover |

| | |
|---|---|
| 9 | Headrest |
| 10 | Pole guide |
| 11 | Seat back trim |
| 12 | Seat back pad |
| 13 | Seat back frame |
| 14 | Seat cushion frame |
| 15 | Seat cushion trim |
| 16 | Seat cushion pad |
| 17 | Reverse cover |
| 18 | Slide adjuster |

**Driver's Seat (Power Seat)**

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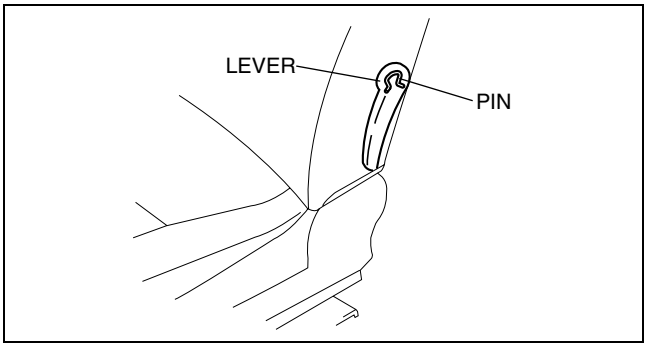
| | |
|---|---|
| 1 | Side air bag module<br>(See 08-10-8 SIDE AIR BAG MODULE REMOVAL/ INSTALLATION.) |
| 2 | Recliner switch knob |
| 3 | Slide and lifter switch knob |
| 4 | Front buckle |
| 5 | Side cover |
| 6 | Rail cover |
| 7 | Front cover No.1 |
| 8 | Front cover No.2 |
| 9 | Lumber support lever<br>(See 09-13-5 Lumber support lever disassembly note) |

| | |
|---|---|
| 10 | Headrest |
| 11 | Pole guide |
| 12 | Seat back trim |
| 13 | Seat back pad |
| 14 | Seat back frame |
| 15 | Seat cushion frame |
| 16 | Seat cushion trim |
| 17 | Seat cushion pad |
| 18 | Reverse cover |
| 19 | Slide adjuster |

**Lumber support lever disassembly note**

1. Remove the pin from the lumber support lever installation part with rag.

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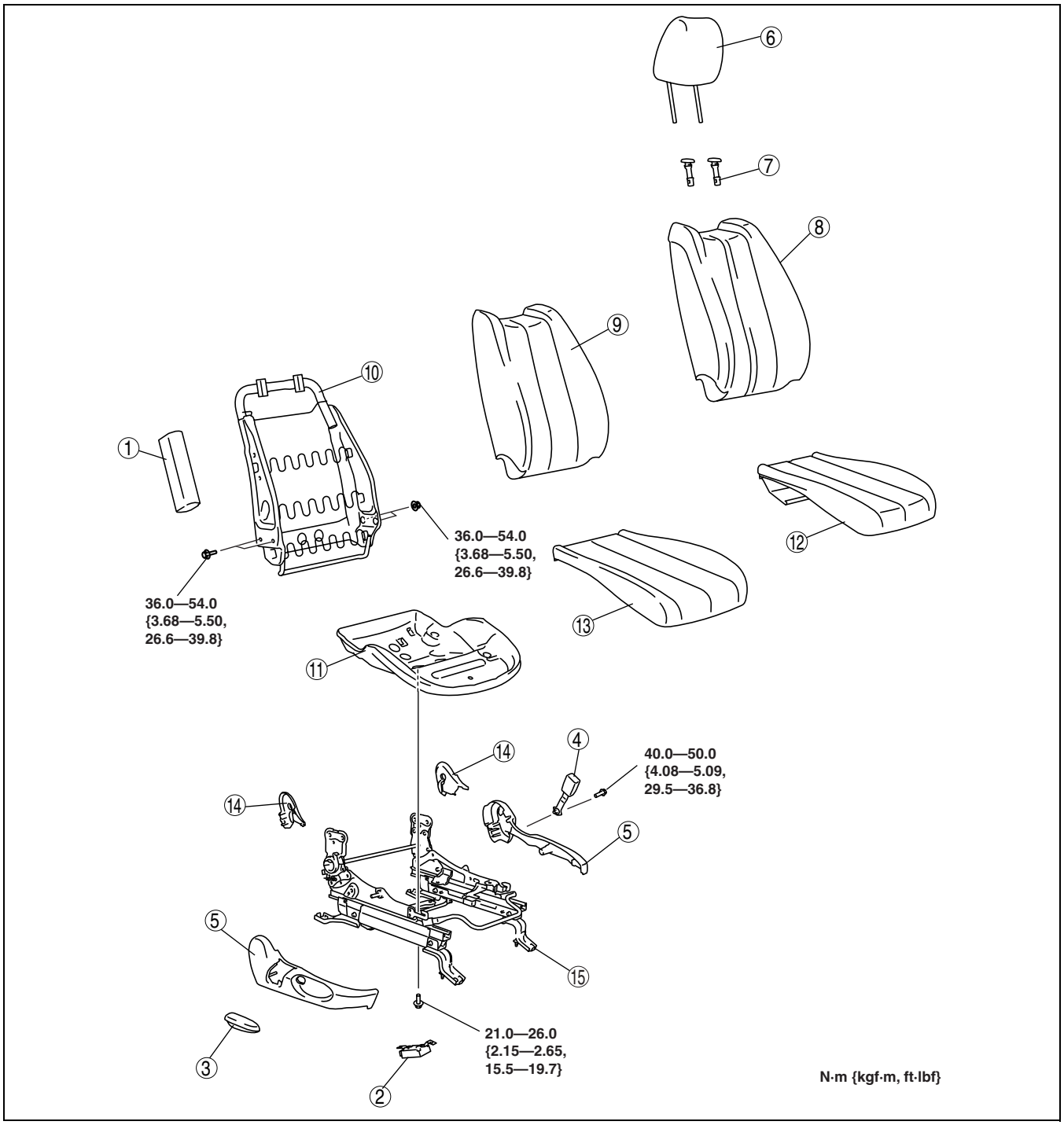
**Passenger's Seat**

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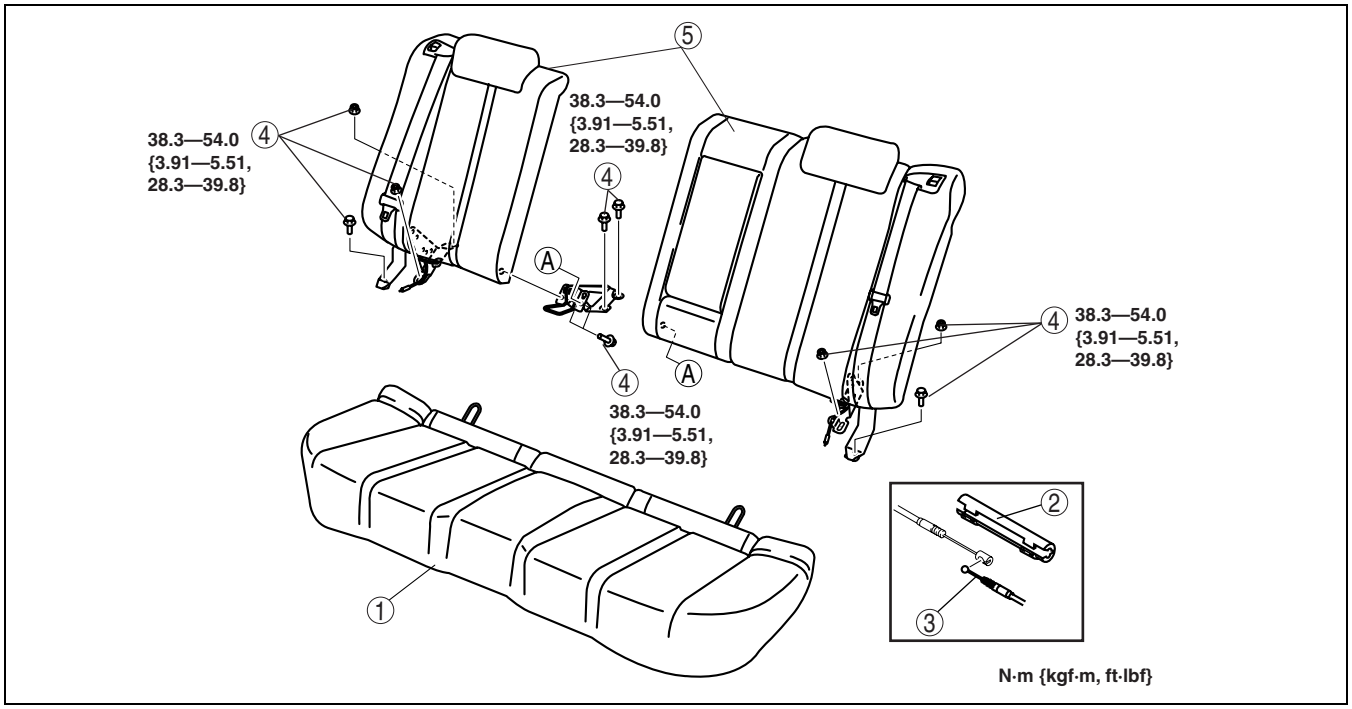
| | |
|---|---|
| 1 | Side air bag module<br>(See 08-10-8 SIDE AIR BAG MODULE REMOVAL/INSTALLATION.) |
| 2 | Seat weight sensor control module<br>(See 08-10-11 SEAT WEIGHT SENSOR CONTROL MODULE REMOVAL/INSTALLATION.) |
| 3 | Recliner lever |
| 4 | Front buckle |
| 5 | Side cover |
| 6 | Headrest |

| | |
|---|---|
| 7 | Pole guide |
| 8 | Seat back trim |
| 9 | Seat back pad |
| 10 | Seat back frame |
| 11 | Seat cushion frame |
| 12 | Seat cushion trim |
| 13 | Seat cushion pad |
| 14 | Reverse cover |
| 15 | Slide adjuster |

## REAR SEAT REMOVAL/INSTALLATION

id091300800400

1. Remove in the order indicated in the table.
2. Install in the reverse order of removal.

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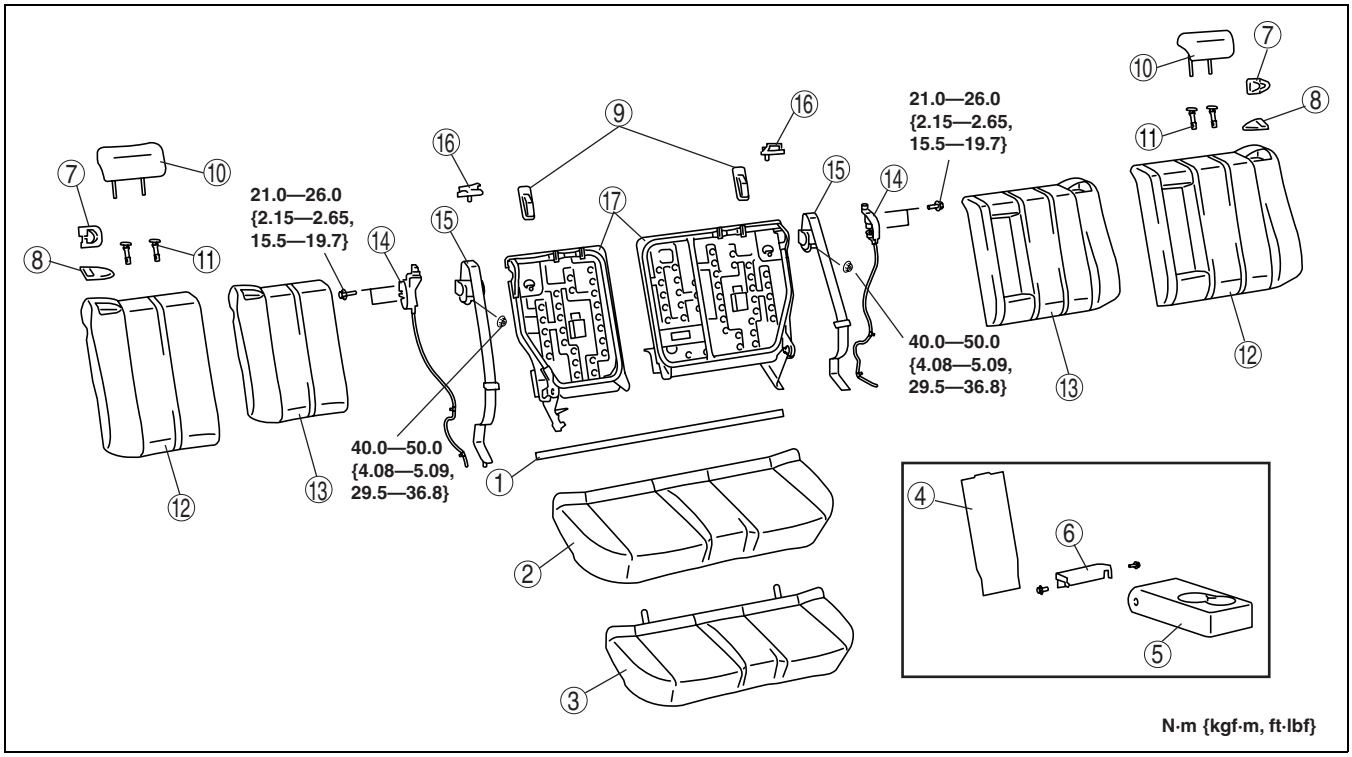
| | |
|---|---|
| 1 | Rear seat cushion |
| 2 | Cover |
| 3 | Remote wire |

| | |
|---|---|
| 4 | Bolt,Nut |
| 5 | Rear seat back |

## REAR SEAT DISASSEMBLY/ASSEMBLY

id091300800500

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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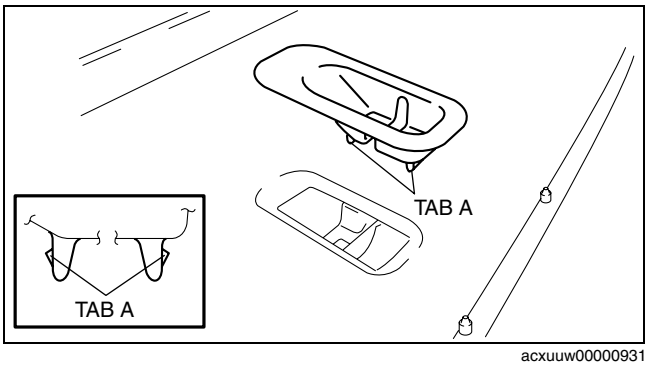
| | |
|---|---|
| 1 | Plate |
| 2 | Seat cushion trim |
| 3 | Seat cushion pad |
| 4 | Armrest board |
| 5 | Armrest |
| 6 | Armrest hinge |
| 7 | Seat back catch cover |
| 8 | Remote button cover |
| 9 | Child seat anchor cover<br>(See 09-13-8 Child seat anchor cover disassembly note.) |

| | |
|---|---|
| 10 | Headrest |
| 11 | Pole guide |
| 12 | Seat back trim |
| 13 | Seat back pad |
| 14 | Seat back catch |
| 15 | Rear seat belt |
| 16 | Seat belt guide |
| 17 | Seat back frame |

### Child seat anchor cover disassembly note

1. Remove tab A, then remove the child seat anchor cover.

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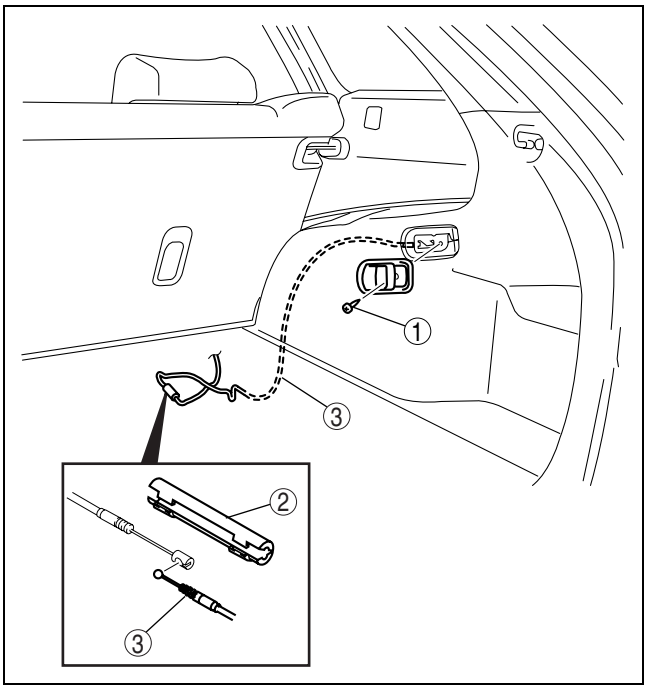
## REMOTE HANDLE LEVER REMOVAL/INSTALLATION

id091300800600

1. To remove the remote wire, remove the trunk side trim. (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Cover |
| 3 | Remote wire |

3. Install in the reverse order of removal.

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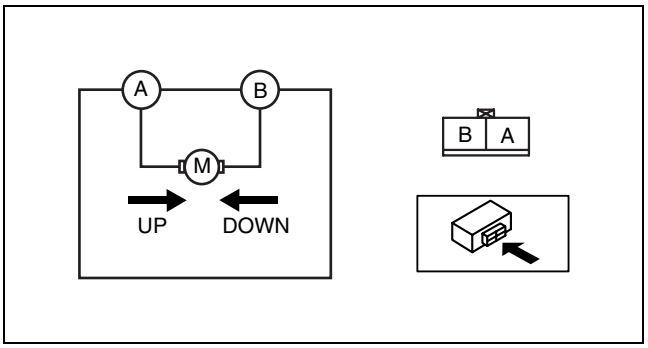
## FRONT TILT MOTOR INSPECTION

id091300800700

1. Disconnect the front tilt motor connector.
2. Apply battery positive voltage to the front tilt motor terminals and inspect the front tilt motor operation
   - If not as specified, replace the slide adjuster.

| Motor operation | Connection | |
|---|---|---|
| | B+ | GND |
| Up | A | B |
| Down | B | A |



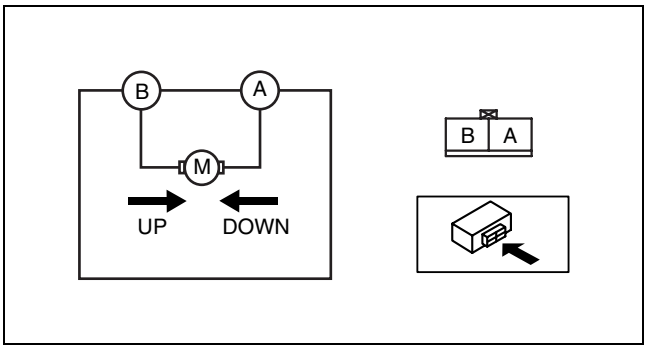

acxuuw00000791

## REAR TILT MOTOR INSPECTION

id091300800800

1. Disconnect the rear tilt motor connector.
2. Apply battery positive voltage to the rear tilt motor terminals and inspect the rear tilt motor operation
   - If not as specified, replace the slide adjuster.

| Motor operation | Connection | |
|---|---|---|
| | B+ | GND |
| Up | B | A |
| Down | A | B |

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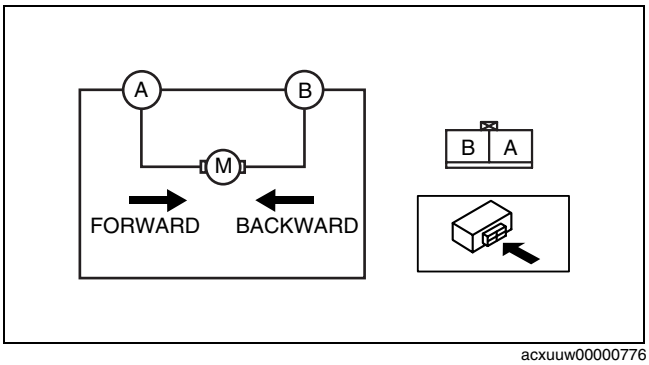
### SLIDE MOTOR INSPECTION

id091300800900

1. Disconnect the slide motor connector.
2. Apply battery positive voltage to the slide motor terminals and inspect the slide motor operation
   - If not as specified, replace the slide adjuster.

| Motor operation | Connection | |
|---|---|---|
| | B+ | GND |
| Forward | A | B |
| Backward | B | A |

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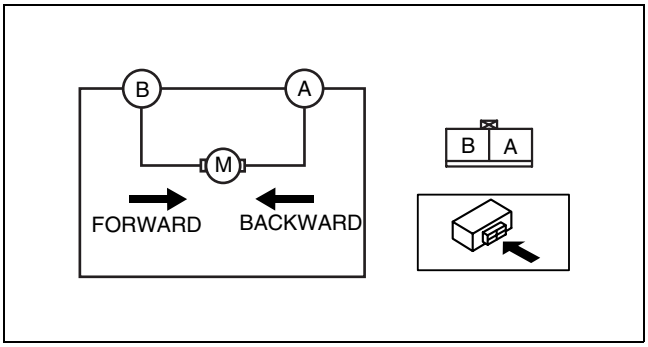
### RECLINER MOTOR INSPECTION

id091300801000

1. Disconnect the recliner motor connector.
2. Apply battery positive voltage to the recliner motor terminals and inspect the recliner motor operation.
   - If not as specified, replace the slide adjuster.

| Motor operation | Connection | |
|---|---|---|
| | B+ | GND |
| Forward | B | A |
| Backward | A | B |

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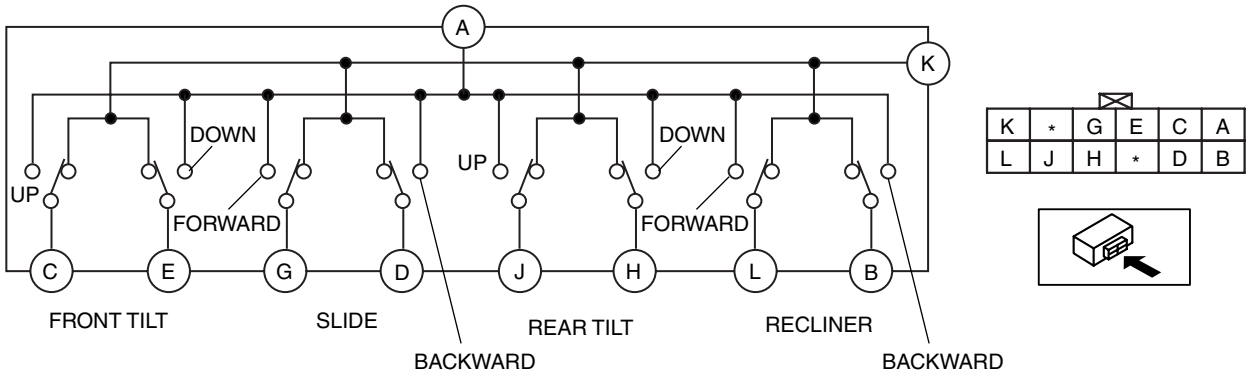
## POWER SEAT SWITCH INSPECTION

id091300801100

1. Disconnect the power seat switch connector.
2. Inspect for continuity between the power seat switch connector terminals using an ohmmeter.
   - If not as specified, replace the power seat switch.

○—○ : Continuity

| Switch position | | Terminal | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | G | H | J | K | L |
| Recliner | Forward | ○ | | | | | | | | ○ | ○ |
| | Off | | ○ | | | | | | | ○ | ○ |
| | Backward | ○ | ○ | | | | | | | ○ | ○ |
| Slide | Forward | ○ | | | ○ | | ○ | | | ○ | |
| | Off | | | | ○ | | ○ | | | ○ | |
| | Backward | ○ | | | ○ | | ○ | | | ○ | |
| Front tilt | Up | ○ | | ○ | | ○ | | | | ○ | |
| | Off | | | ○ | | ○ | | | | ○ | |
| | Down | ○ | | ○ | | ○ | | | | ○ | |
| Rear tilt | Up | ○ | | | | | | ○ | ○ | ○ | |
| | Off | | | | | | | ○ | ○ | ○ | |
| | Down | ○ | | | | | | ○ | ○ | ○ | |

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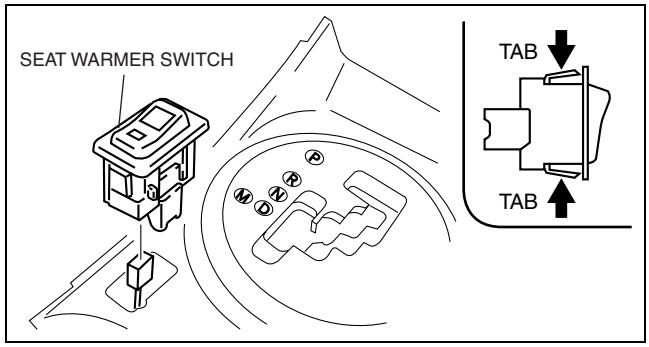
## SEAT WARMER SWITCH REMOVAL/INSTALLATION

id091300801200

1. Disconnect the negative battery cable.
2. Remove the panel. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
3. Install in the reverse order of removal.

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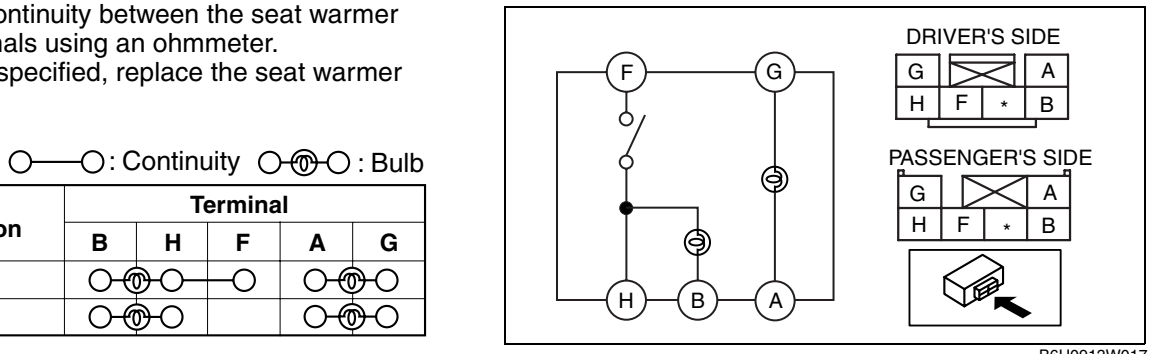
**Seat Warmer Switch Removal Note**

1. Squeeze the tabs of seat warmer switch and pull it outward to remove it.

## SEAT WARMER SWITCH INSPECTION

id091300801300

1. Inspect for continuity between the seat warmer switch terminals using an ohmmeter.
   - If not as specified, replace the seat warmer switch.




B6U0913W017

○—○ : Continuity ○-⓪-○ : Bulb

| Switch position | Terminal | | | | |
|---|---|---|---|---|---|
| | B | H | F | A | G |
| ON | ○-⓪-○ | | ○ | ○-⓪-○ | |
| OFF | ○-⓪-○ | | | ○-⓪-○ | |

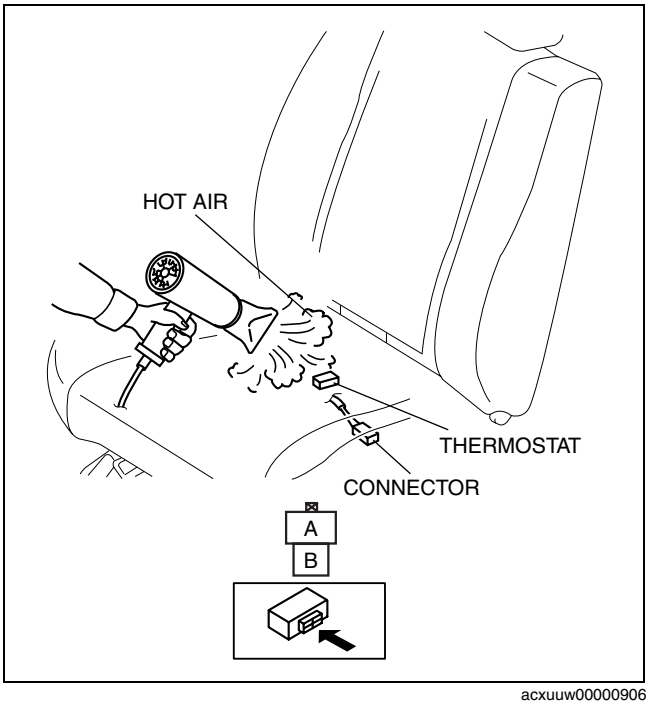
A6E7752W024

## SEAT WARMER UNIT INSPECTION

id091300801400

**Seat Cushion**

1. Remove the front seat. (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
2. Remove the seat cushion trim. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.)
3. While inspecting for continuity between the connector terminals A and B, use a dryer to warm the thermostat of the seat warmer unit on seat cushion.

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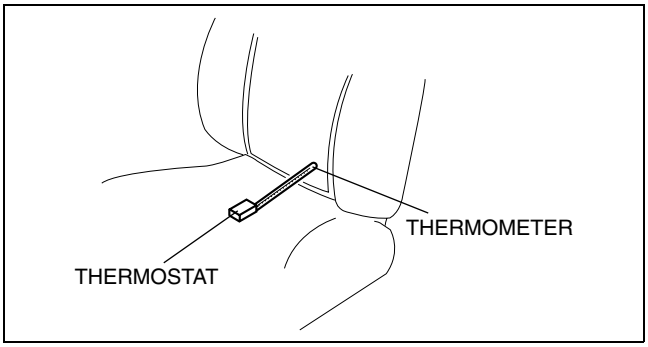
4. When the ohmmeter indicates that there is no continuity, turn off the dryer, then use a thermometer to measure the temperature of the thermostat.
5. Verify that the temperature is **approx. 37 °C {99 °F}**.

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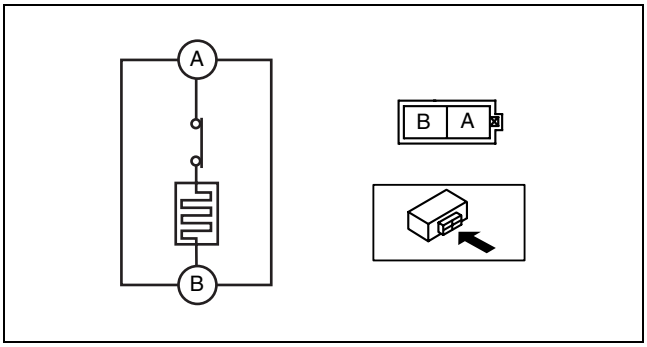
6. Using an ohmmeter, verify that there is continuity between the seat warmer unit connector terminals when temperature drops to **approx. 28 °C {82 °F}.**
   - If not as indicated in the table, replace the seat warmer unit.




acxuuw00000908

○—○ : Continuity

| Thermostat temperature | Terminal | |
|---|---|---|
| | A | B |
| More than approx. 37 °C {99 °F} | | |
| Less than approx. 28 °C {82 °F} | ○ | ○ |

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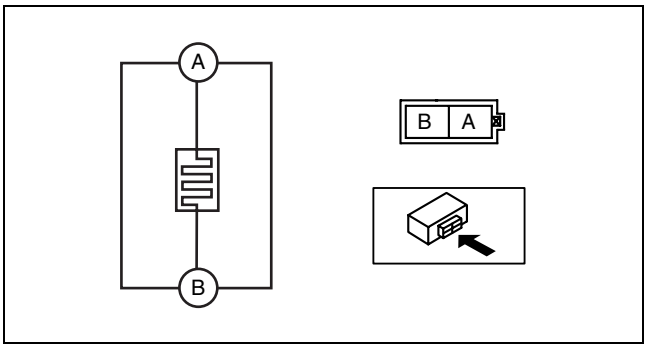
**Seat Back**

1. Remove the front seat. (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
2. Remove the seat back trim. (See 09-13-2 FRONT SEAT DISASSEMBLY/ASSEMBLY.)
3. Verify that the continuity between terminals A and B is as indicated in the table.
   - If not as indicated in the table, replace the seat warmer unit.

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○—○ : Continuity

| Test condition | Terminal | |
|---|---|---|
| | A | B |
| Under any condition | ○ | ○ |

acxuuw00000911

# 09-14 SECURITY AND LOCKS


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## SECURITY AND LOCKS LOCATION INDEX

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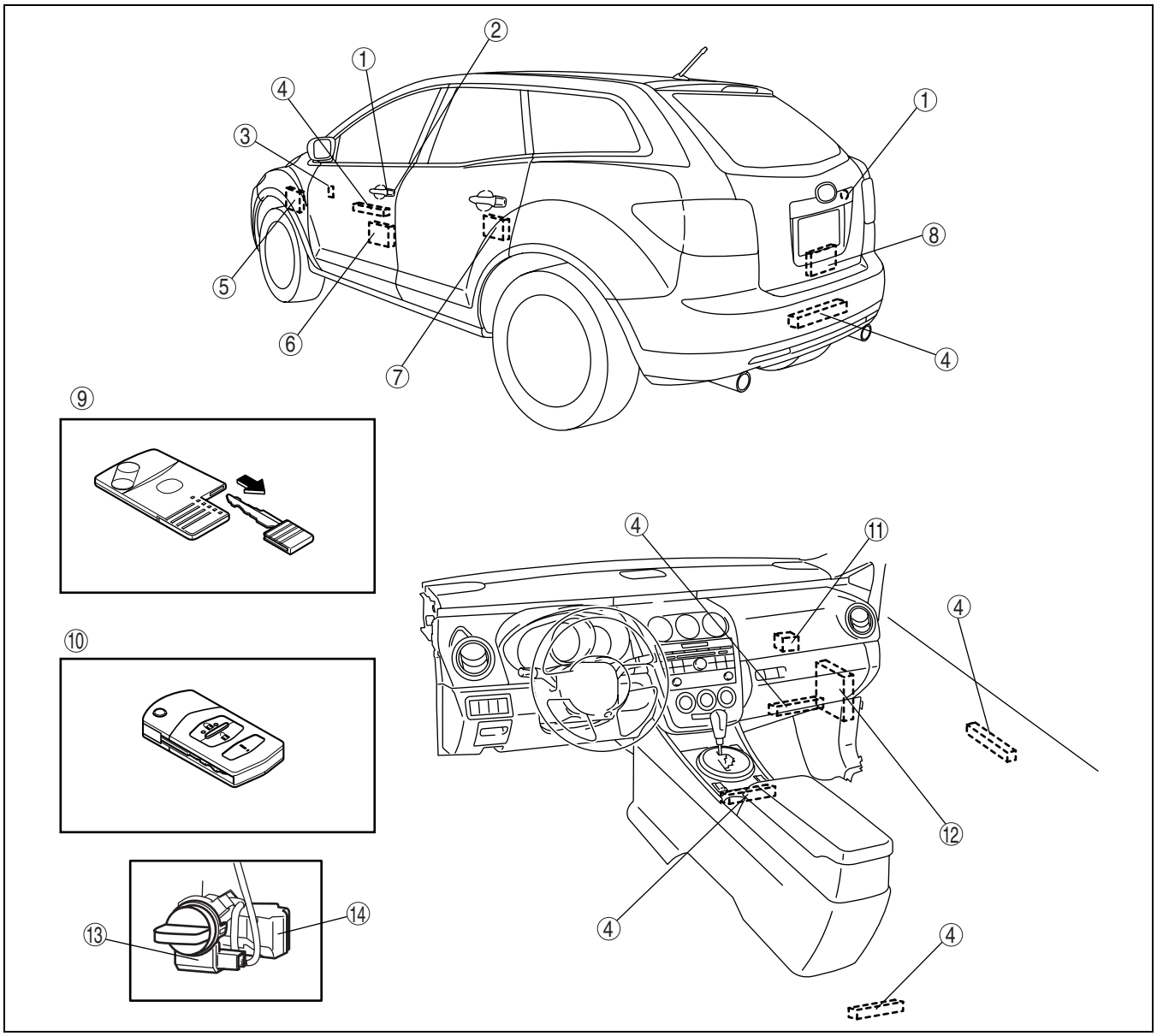


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| | |
|---|---|
| 1 | Request switch<br>(See 09-14-39 REQUEST SWITCH REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-40 REQUEST SWITCH INSPECTION[ADVANCED KEYLESS SYSTEM].) |
| 2 | Front door key cylinder<br>(See 09-14-4 FRONT DOOR KEY CYLINDER REMOVAL/INSTALLATION.) |
| 3 | Door lock switch<br>(See 09-14-8 DOOR LOCK SWITCH REMOVAL/ INSTALLATION.)<br>(See 09-14-8 DOOR LOCK SWITCH INSPECTION.) |
| 4 | Keyless antenna<br>(See 09-14-37 KEYLESS ANTENNA REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |
| 5 | Keyless beeper<br>(See 09-14-39 KEYLESS BEEPER REMOVAL/ INSTALLATION[ADVANCED KEYLESS SYSTEM].) |

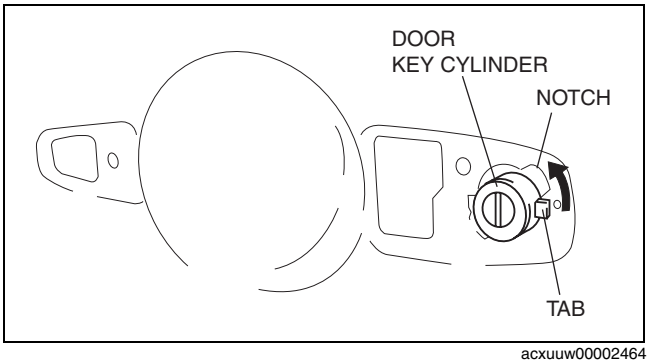
| | |
|---|---|
| 6 | Front door latch and lock actuator<br>(See 09-14-5 FRONT DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.)<br>(See 09-14-6 FRONT DOOR LATCH AND LOCK ACTUATOR INSPECTION.)<br>(See 09-14-7 FRONT DOOR LOCK ACTUATOR INSPECTION.)<br>(See 09-14-7 DOOR LOCK-LINK SWITCH INSPECTION.)<br>(See 09-14-7 FRONT DOOR KEY CYLINDER SWITCH INSPECTION.) |
| 7 | Rear door latch and lock actuator<br>(See 09-14-5 REAR DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.)<br>(See 09-14-6 REAR DOOR LATCH AND LOCK ACTUATOR INSPECTION.)<br>(See 09-14-7 REAR DOOR LOCK ACTUATOR INSPECTION.)<br>(See 09-14-7 DOOR LOCK-LINK SWITCH INSPECTION.) |

| | |
|---|---|
| 8 | Liftgate latch and lock actuator<br>(See 09-14-10 LIFTGATE LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION.)<br>(See 09-14-10 LIFTGATE LOCK ACTUATOR INSPECTION.)<br>(See 09-14-10 LIFTGATE LATCH SWITCH INSPECTION.) |
| 9 | Card key<br>(See 09-14-29 CARD KEY BATTERY REPLACEMENT[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-33 CARD KEY ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-34 CLEARING CARD KEY[ADVANCED KEYLESS SYSTEM].) |
| 10 | Transmitter<br>(See 09-14-26 TRANSMITTER BATTERY REPLACEMENT[KEYLESS ENTRY SYSTEM].)<br>(See 09-14-28 TRANSMITTER ID CODE REGISTRATION[KEYLESS ENTRY SYSTEM].) |
| 11 | Keyless receiver<br>(See 09-14-36 KEYLESS RECEIVER REMOVAL/INSTALLATION.)<br>(See 09-14-36 KEYLESS RECEIVER INSPECTION.) |
| 12 | Keyless control module<br>(See 09-14-30 KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-30 KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-32 KEYLESS CONTROL MODULE CONFIGURATION[ADVANCED KEYLESS SYSTEM].)<br>(See 09-14-35 CUSTOMIZED FUNCTION SETTING PROCEDURE[ADVANCED KEYLESS SYSTEM].) |
| 13 | Coil antenna<br>(See 09-14-11 COIL ANTENNA REMOVAL/INSTALLATION.) |
| 14 | Steering lock unit<br>(See 09-14-35 STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].) |

### FRONT DOOR KEY CYLINDER REMOVAL/INSTALLATION

id091400800300

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Inner garnish (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
   (2) Front door trim (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
   (3) Front outer handle (See 09-14-8 FRONT OUTER HANDLE REMOVAL/INSTALLATION.)
3. Remove the rod from the front door key cylinder.
4. Turn the key cylinder in the direction indicated by the arrow and move the tab to the notch.
5. Pull the front door key cylinder outward to remove it.
6. Install in the reverse order of removal.

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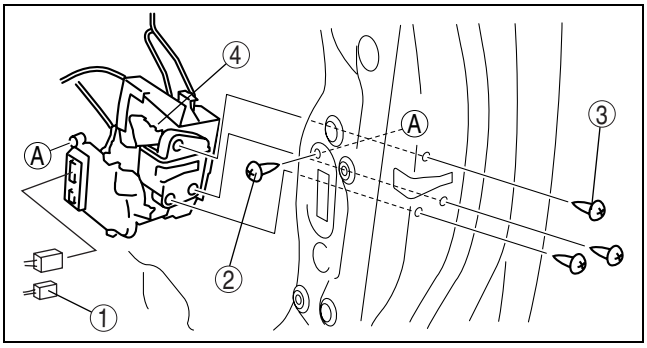
### FRONT DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION

id091400800400

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Inner garnish (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
   (2) Front door trim (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
   (3) Front door glass (See 09-12-3 FRONT DOOR GLASS REMOVAL/INSTALLATION.)
   (4) Front door speaker (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)
   (5) Inner handle (See 09-14-9 INNER HANDLE REMOVAL/INSTALLATION.)
   (6) Front door unit (See 09-11-4 FRONT DOOR UNIT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Screw A |
| 3 | Screw B |
| 4 | Front door latch and lock actuator |

4. Install in the reverse order of removal.

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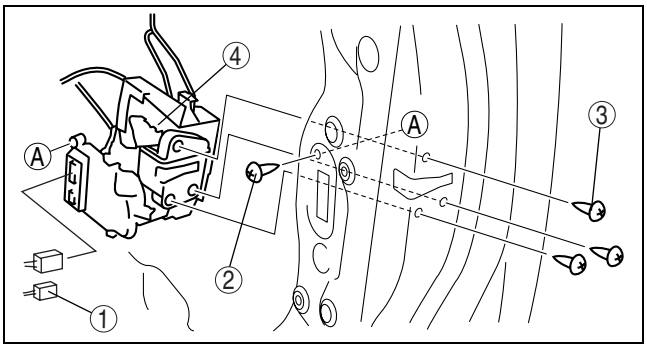
### REAR DOOR LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION

id091400800500

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front door trim (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
   (2) Front door glass (See 09-12-4 REAR DOOR GLASS REMOVAL/INSTALLATION.)
   (3) Front door speaker (See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)
   (4) Inner handle (See 09-14-9 INNER HANDLE REMOVAL/INSTALLATION.)
   (5) Front door unit (See 09-11-4 REAR DOOR UNIT REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Screw A |
| 3 | Screw B |
| 4 | Front door latch and lock actuator |

4. Install in the reverse order of removal.

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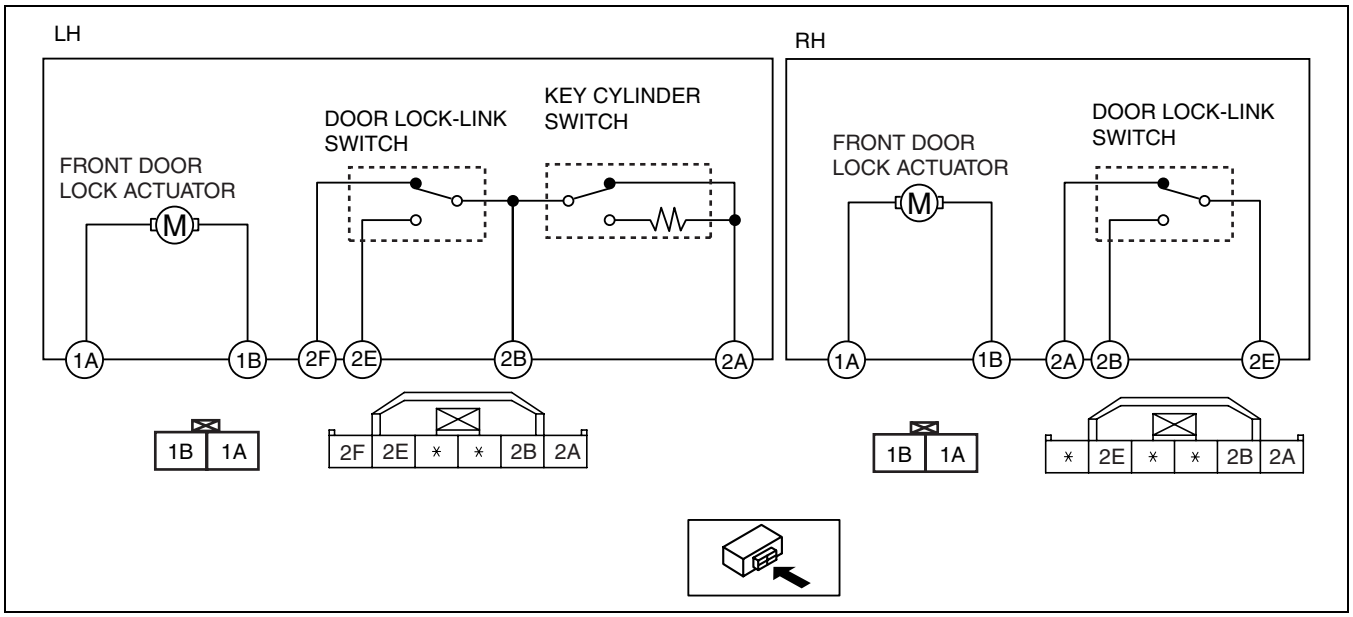
### FRONT DOOR LATCH AND LOCK ACTUATOR INSPECTION

id091400800600

1. The following actuators and switches are integrated with the front door latch and lock actuator. Inspect the front door latch and lock actuator according to each inspection procedure for the following items.
   - Front door lock actuator (See 09-14-7 FRONT DOOR LOCK ACTUATOR INSPECTION.)
   - Front door key cylinder switch (Driver's side) (See 09-14-7 FRONT DOOR KEY CYLINDER SWITCH INSPECTION.)
   - Door lock-link switch (See 09-14-7 DOOR LOCK-LINK SWITCH INSPECTION.)

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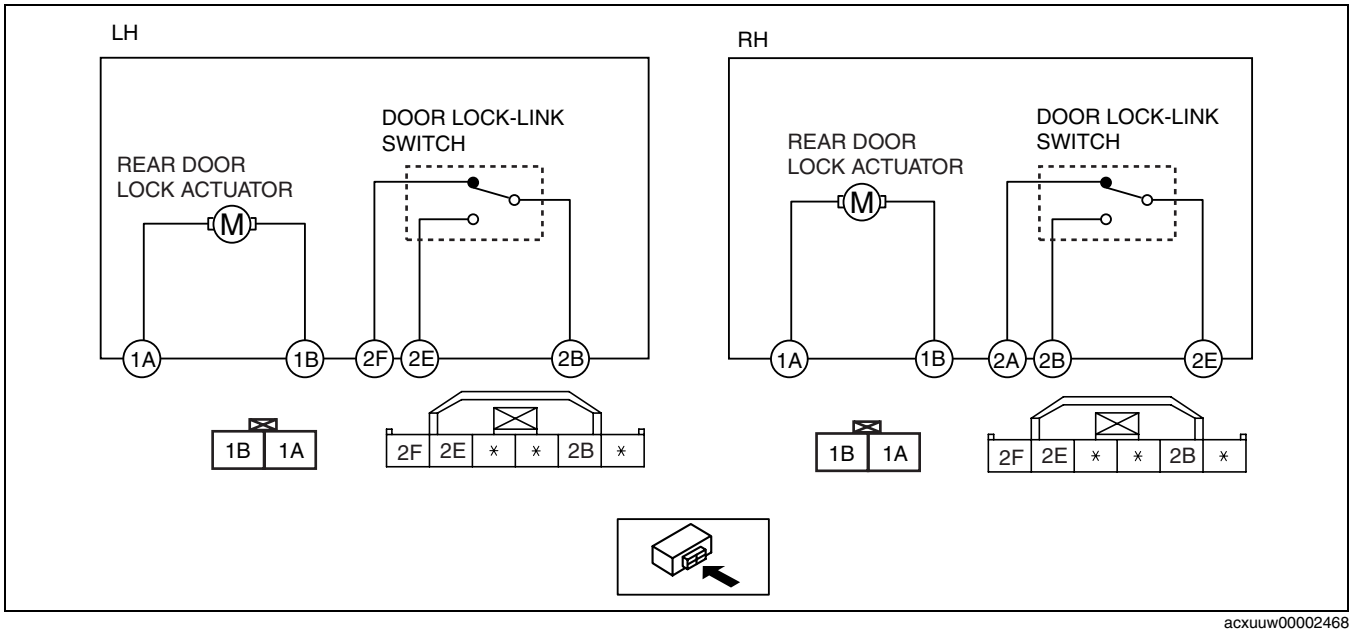
### REAR DOOR LATCH AND LOCK ACTUATOR INSPECTION

id091400800700

1. The following actuator and switch are integrated with the rear door latch and lock actuator. Inspect the rear door latch and lock actuator according to each inspection procedure for the following items.
   - Rear door lock actuator (See 09-14-7 REAR DOOR LOCK ACTUATOR INSPECTION.)
   - Rear door latch switch (See 09-14-7 DOOR LOCK-LINK SWITCH INSPECTION.)

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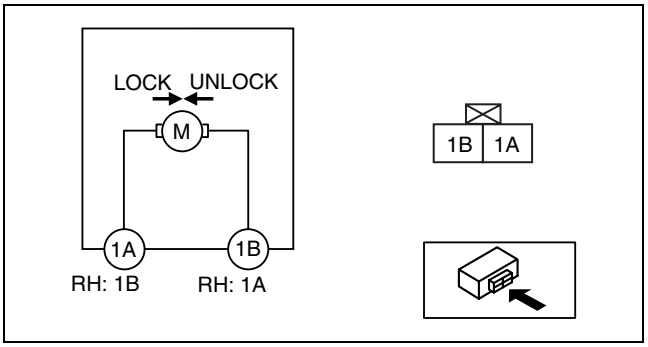
## FRONT DOOR LOCK ACTUATOR INSPECTION

id091400800800

1. Apply battery positive voltage and connect ground to the corresponding front door lock actuator terminals, and inspect the front door lock actuator operation.
   - If not as specified, replace the front door latch and lock actuator.

| Lock actuator operation | Connection | |
|---|---|---|
| | B+ | GND |
| Lock | LH: 1A<br>RH: 1B | LH: 1B<br>RH: 1A |
| Unlock | LH: 1B<br>RH: 1A | LH: 1A<br>RH: 1B |

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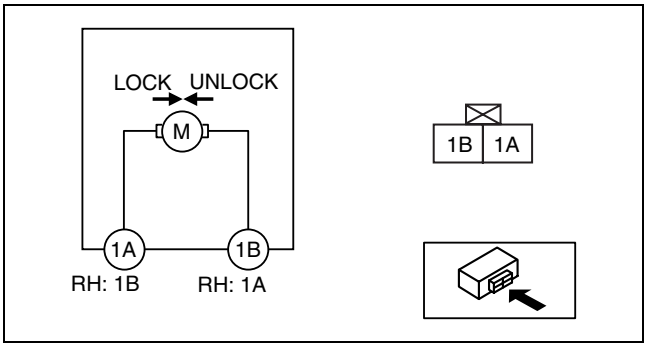
## REAR DOOR LOCK ACTUATOR INSPECTION

id091400800900

1. Apply battery positive voltage and connect ground to the corresponding front door lock actuator terminals, and inspect the front door lock actuator operation.
   - If not as specified, replace the front door latch and lock actuator.

| Lock actuator operation | Connection | |
|---|---|---|
| | B+ | GND |
| Lock | LH: 1A<br>RH: 1B | LH: 1B<br>RH: 1A |
| Unlock | LH: 1B<br>RH: 1A | LH: 1A<br>RH: 1B |

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## DOOR LOCK-LINK SWITCH INSPECTION

id091400801200

### Front/rear

1. Inspect for continuity between the door lock-link switch terminals.
   - If not as specified, replace the front door latch and lock actuator.

: Continuity

| Lock knob position | Terminal | | |
|---|---|---|---|
| | LH: 2F<br>RH: 2A | LH: 2B<br>RH: 2E | LH: 2E<br>RH: 2B |
| Lock | | ○ | ○ |
| Unlock | ○ | ○ | |

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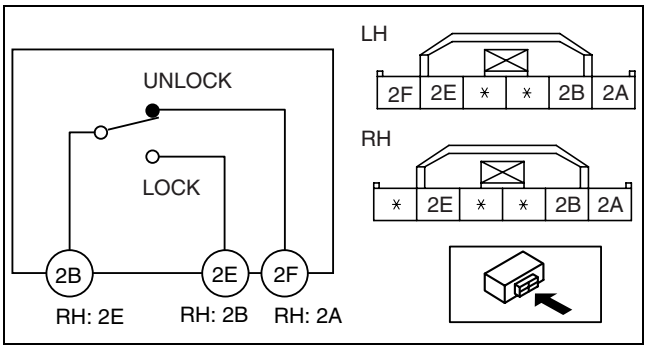


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## FRONT DOOR KEY CYLINDER SWITCH INSPECTION

id091400801300

1. Inspect for continuity between the front door key cylinder switch terminals.
   - If not as specified, replace the front door latch and lock actuator.

: Continuity

| Key cylinder position | Terminal | |
|---|---|---|
| | 2A | 2B |
| Unlock | ○ | ○ |
| Lock | ○ R ○ | |

R : 1 k ohm

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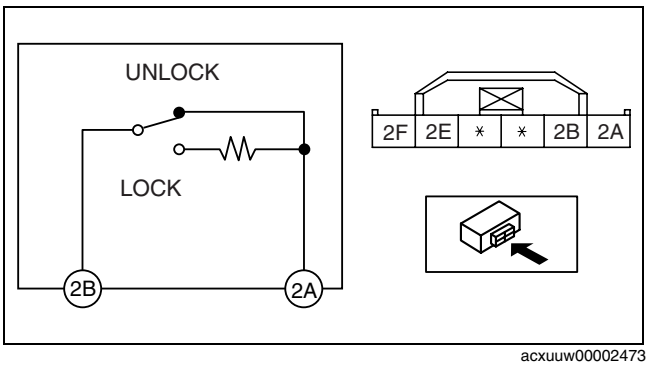


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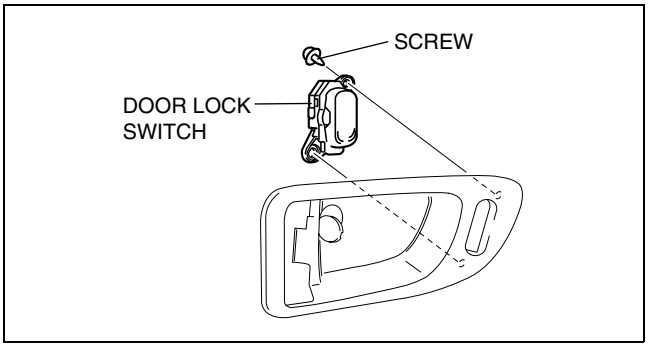
## DOOR LOCK SWITCH REMOVAL/INSTALLATION

id091400801400

1. Disconnect the negative battery cable.
2. Remove the inner handle cover. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove the screws, then remove the door lock switch.
4. Install in the reverse order of removal.

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## DOOR LOCK SWITCH INSPECTION

id091400801500

1. Inspect for continuity between the door lock switch terminals using an ohmmeter.
   - If not as specified, replace the door lock switch.

○——○ : Continuity ○-WW-○ : Resistance

| Position | Terminal | |
|---|---|---|
| | C | D |
| Lock | ○——WW——○ | R |
| Unlock | ○——— | ——○ |

R: 940—1,060 ohms

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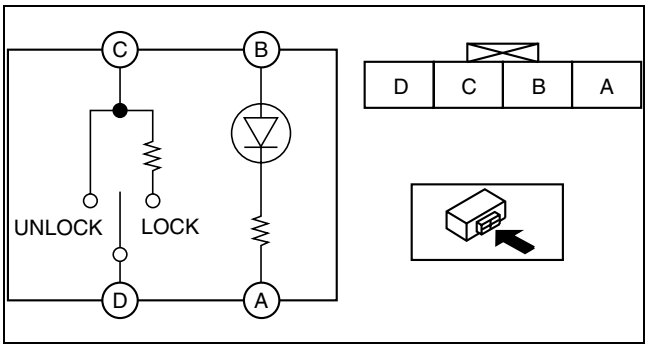


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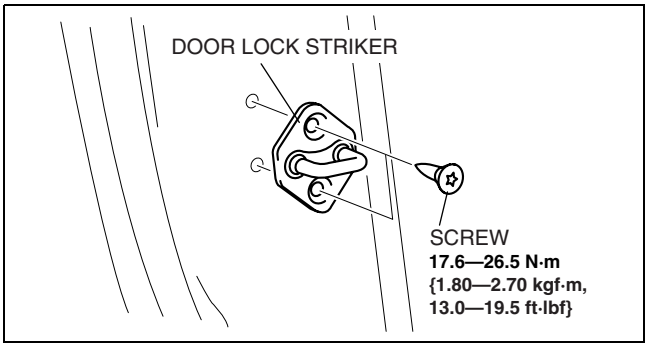
## DOOR LOCK STRIKER REMOVAL/INSTALLATION

id091400801600

1. Remove the screws, then remove the door lock striker.
2. Install in the reverse order of removal.
3. Adjust the door. (See 09-11-3 DOOR ADJUSTMENT.)

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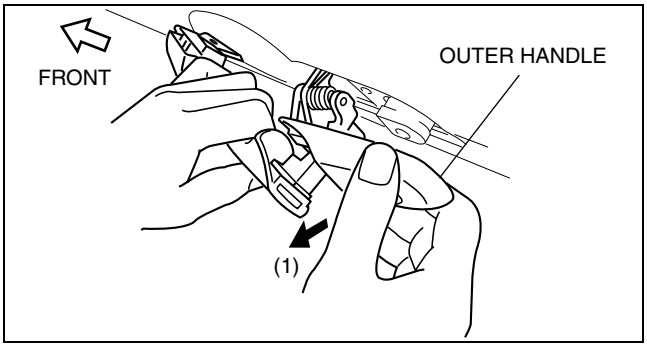
## FRONT OUTER HANDLE REMOVAL/INSTALLATION

id091400803100

1. Disconnect the negative battery cable.
2. Fully roll up the front door glass.
3. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
4. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
5. Remove the hole cover.
6. Detach the rod from the outer handle.

7. Secure the rear part of the front outer handle and, with the front outer handle lever pulled outward (1), remove the rear part of the front outer handle from the front door.
8. Pull out the front side of the front outer handle from the front door.
9. Install in the reverse order of removal.



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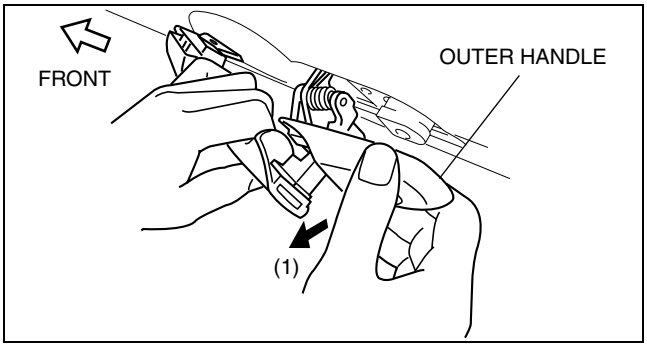
### REAR OUTER HANDLE REMOVAL/INSTALLATION

id091400803200

1. Disconnect the negative battery cable.
2. Fully roll up the rear door glass.
3. Remove the rear door trim. (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
4. Secure the rear part of the rear outer handle and, with the rear outer handle lever pulled outward (1), remove the rear part of the rear outer handle from the rear door.
5. Install in the reverse order of removal.



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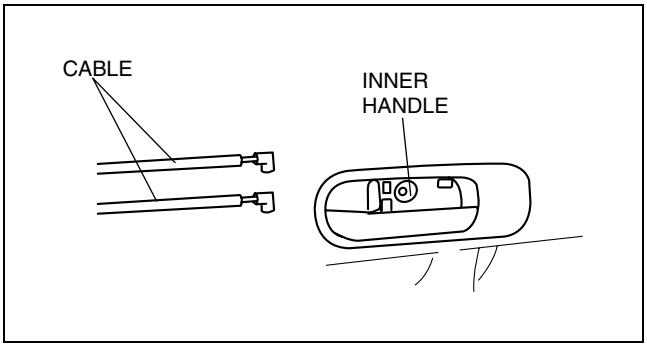
### INNER HANDLE REMOVAL/INSTALLATION

id091400803300

1. Disconnect the negative battery cable.
2. Remove the front door trim or rear door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.) (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
3. Detach the cables from the inner handle and door lock knob.
4. Install in the reverse order of removal.



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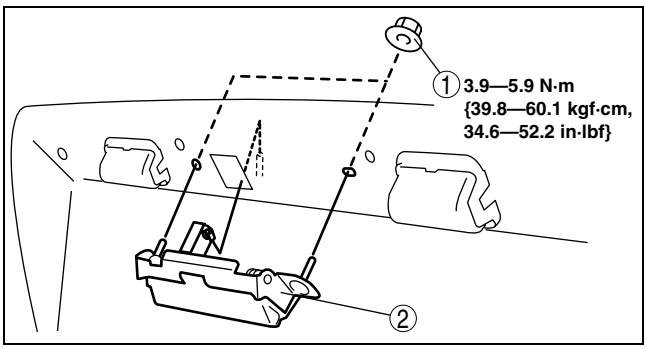
### LIFTGATE OUTER HANDLE REMOVAL/INSTALLATION

id091400803700

1. Remove the rear finisher. (See 09-16-3 REAR FINISHER REMOVAL/INSTALLATION.)
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Nut |
| 2 | Liftgate outer handle |

3. Install in the reverse order of removal.



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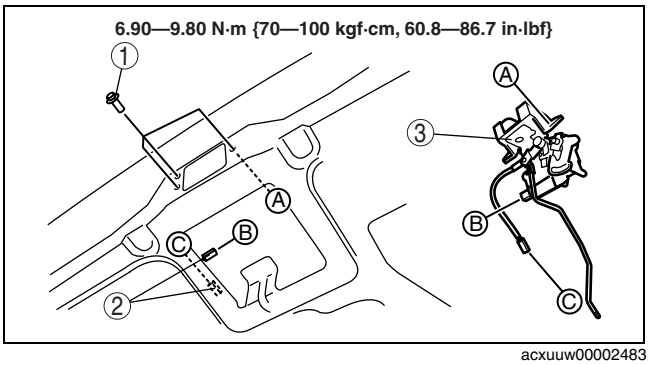
## LIFTGATE LATCH AND LOCK ACTUATOR REMOVAL/INSTALLATION

id091400803800

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Connector |
| 3 | Liftgate latch and lock actuator |

3. Install in the reverse order of removal.

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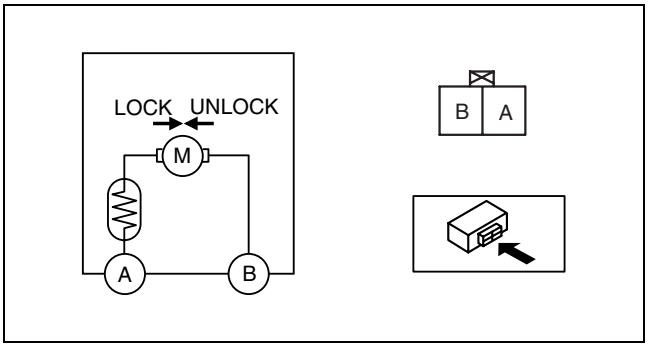
## LIFTGATE LOCK ACTUATOR INSPECTION

id091400803900

1. Apply battery positive voltage and connect ground to the corresponding liftgate lock actuator terminals, and inspect the liftgate lock actuator operation.
   - If not as specified, replace the liftgate latch and lock actuator.

| Lock actuator operation | Connection | |
|---|---|---|
| | B+ | GND |
| Lock | A | B |
| Unlock | B | A |

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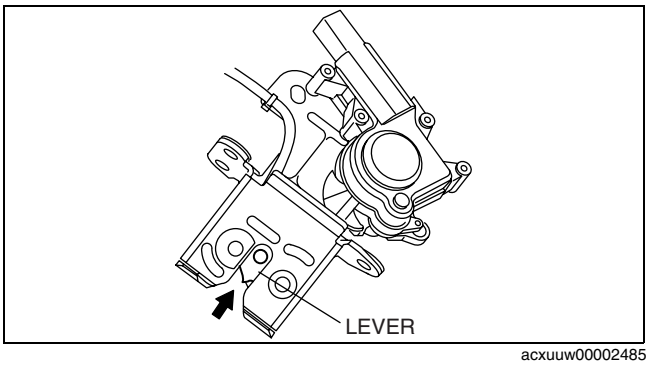
## LIFTGATE LATCH SWITCH INSPECTION

id091400804000

1. When inspecting the latch, press the latch lever using a flathead screwdriver or a similar tool.

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2. Inspect for continuity between the liftgate latch switch terminals.
   - If not as specified, replace the liftgate latch and lock actuator.

○——○ : Continuity

| Latch condition | Terminal | |
|---|---|---|
| | A | B |
| Latch (liftgate is closed) | | |
| Unlatch (liftgate is open) | ○ | ○ |

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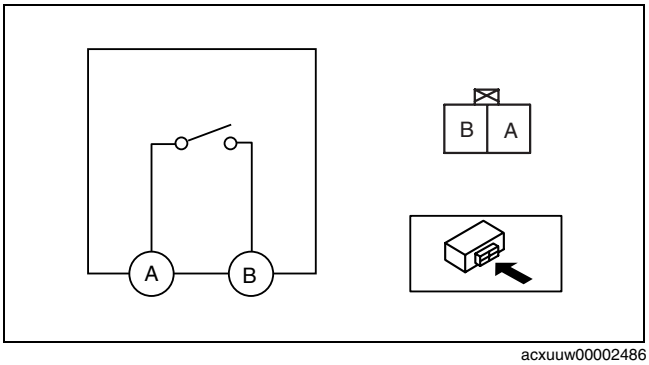


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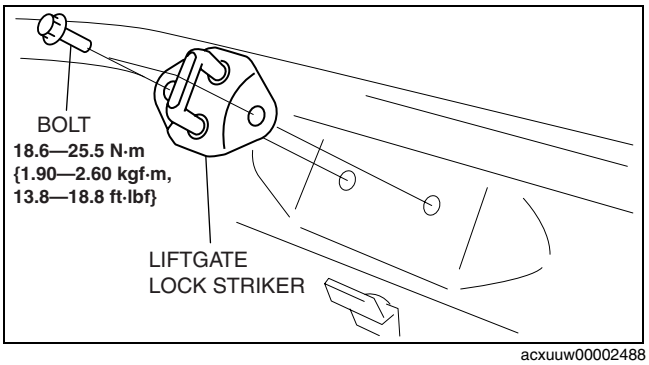
### LIFTGATE LOCK STRIKER REMOVAL/INSTALLATION

id091400804100

1. Remove the trunk end trim. (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the bolts, then remove the liftgate lock striker.
3. Install in the reverse order of removal.
4. Adjust the liftgate. (See 09-11-6 LIFTGATE ADJUSTMENT.)

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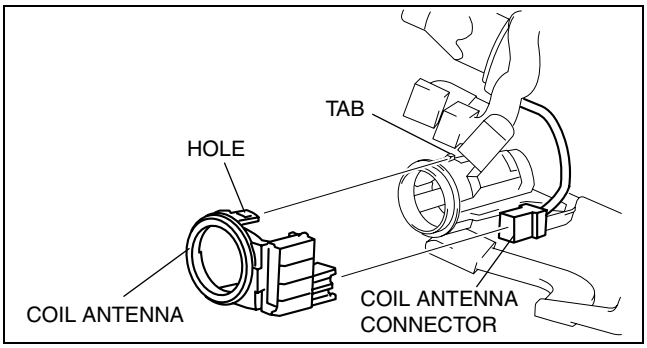
### COIL ANTENNA REMOVAL/INSTALLATION

id091400804900

**Note**
- Do not remove the coil antenna unless you are replacing it.

1. Disconnect the negative battery cable.
2. Disconnect the coil antenna connector.
3. Detach the steering lock tabs from the holes on the coil antenna.
4. Install in the reverse order of removal.

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### IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM]

id0914008050b1

**Foreword**
- When performing the following procedures, the immobilizer resetting procedure using the M-MDS must also always be performed: “Keyless control module replacement”, “PCM replacement”, “Steering lock unit replacement”, “Keyless control module and PCM joint replacement”, “Keyless control module, PCM, and steering lock unit joint replacement”, and “Key ID number clearing”. The engine will not start unless all work is performed using the M-MDS.
- A card key that can start the engine is necessary for the key programming. If there is no card key that can start the engine, perform the key programming after the card key programming. (See 09-14-33 CARD KEY ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].)
- There are two ways to add supplemental key: Using the M-MDS or using two keys that can start the engine to program.
- When replacing any of the immobilizer system component parts, adding/clearing keys, or performing other functions, refer to the following table and perform the applicable procedure (No.1 to 5).
- Verify that the room fuse is equipped.

| Ref. No. | Condition | Items necessary for procedure (prepare before starting procedure) | Cautionary notes |
|---|---|---|---|
| 1 | Since two or more keys that can start the engine are necessary, make a spare key. Or program an additional key. | • Programming key | • The M-MDS is necessary for the additional key programming if “Customer spare key programming disable” is performed before the procedure using the M-MDS. In this case, perform No. 2. |
| 2 | If there is only one key that can start the engine, make a spare key. If there is no key, program an additional key. | • Programmed card key<br>• Programming key<br>• M-MDS | - |

| Ref. No. | Condition | Items necessary for procedure (prepare before starting procedure) | Cautionary notes |
|---|---|---|---|
| 3 | Replacing the PCM only. | • New PCM<br>• Programmed card key<br>• Programming keys (two or more)<br>• M-MDS | - |
| 4 | Changing the additional key programming procedure. (Method for programming other keys using two keys that can start the engine is disabled.) | • M-MDS | • The additional key programming using No. 1 cannot be performed after the procedure. It is possible to restore the setting. For restoring the setting, the M-MDS is necessary. |
| 4 | Changing the additional key programming procedure. Allows programming using two keys that can start the engine. | • M-MDS | • New vehicles have this setting. |
| 5 | Clearing the programmed key ID number. | • Programming keys (two or more)<br>• M-MDS | • Carry out the following procedure using the M-MDS, then go to 09-14-14 Procedure<br>— Ignition key CODE erase |
| 5 | Replacing all the keys. (Steering lock unit is not replaced) | • Programmed card key<br>• Programming keys (two or more)<br>• M-MDS | |
| 5 | Replacing the steering lock unit. | • New steering lock unit<br>• Programmed card key<br>• New keys (two or more)<br>• M-MDS | • Carry out the following procedure using the M-MDS, then go to 09-14-14 Procedure<br>— Ignition key CODE erase<br>— STEERING LOCK UNIT PROGRAMMING |
| 5 | Replacing the keyless control module. | • New keyless control module<br>• Card key<br>• Programming keys (two or more)<br>• M-MDS | • Carry out the following procedure using the M-MDS, then go to 09-14-14 Procedure<br>— Ignition key CODE erase<br>— CARD KEY PROGRAMMING<br>— STEERING LOCK UNIT PROGRAMMING |
| - | Replacing the coil antenna. | • New coil antenna | • Immobilizer system resetting is not necessary. |

**Caution**

- **The following conditions may cause poor signal communication between the key and vehicle, resulting in the engine not starting or a key registration error. Do not perform any work under the following conditions:**
  - **— Placing the following items close to the key grip or contacting it.**
    - **Spare keys**
    - **Keys for other vehicles equipped with an immobilizer system**
    - **Any metallic object**
    - **Any electronic device, or any credit or other card with magnetic strips**
- **Do not place the following devices in the vehicle while programming, otherwise programming cannot be performed:**
  - **— M-MDS**
  - **— Personal computer**
  - **— Devices that can send/receive the radio waves**

**Note**

- The “valid key” used in this manual indicates the key that can start the engine.
- If the key adding, programming, clearing, and immobilizer system construction parts replacement are performed, verify that the all keys can start the engine within **5 s** after the procedure.
- When verifying that the engine starts, wait at least **5 s or more** before starting the engine using the next key.
- If the engine cannot be started using a programmed key, repeat the procedure from the beginning.

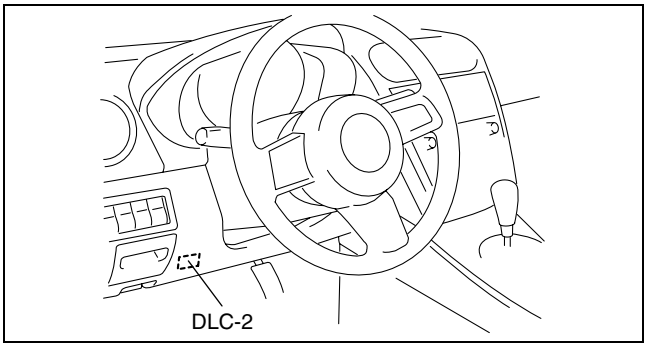
- Do not start the engine unless indicated in the procedure. If the engine is started during the programming procedure, programming is stopped at that point. Repeat the procedure starting from the beginning if the engine is started before completion.
- Do not place the card key in the vehicle or bring it **within approx. 1 m** of the vehicle unless indicated in the procedure.
- Two or more key ID numbers must be programmed for the engine to start.
- A maximum of eight key ID numbers can be programmed for one vehicle. The M-MDS can be used to verify the number of key ID numbers programmed to a single vehicle.
- Do not select a M-MDS screen menu other than one indicated in the procedure.

**M-MDS Connecting Procedure**

**Caution**
- **Do not place the M-MDS in the vehicle while programming, otherwise programming cannot be performed.**

1. Fully lower the door glass.
2. Connect the M-MDS to the DLC-2.
3. Pull out the M-MDS cable from the door glass opening and set the M-MDS outside the vehicle.

**Caution**
- **Protect the cable and body contact area with a clean rag, otherwise they could be damaged.**



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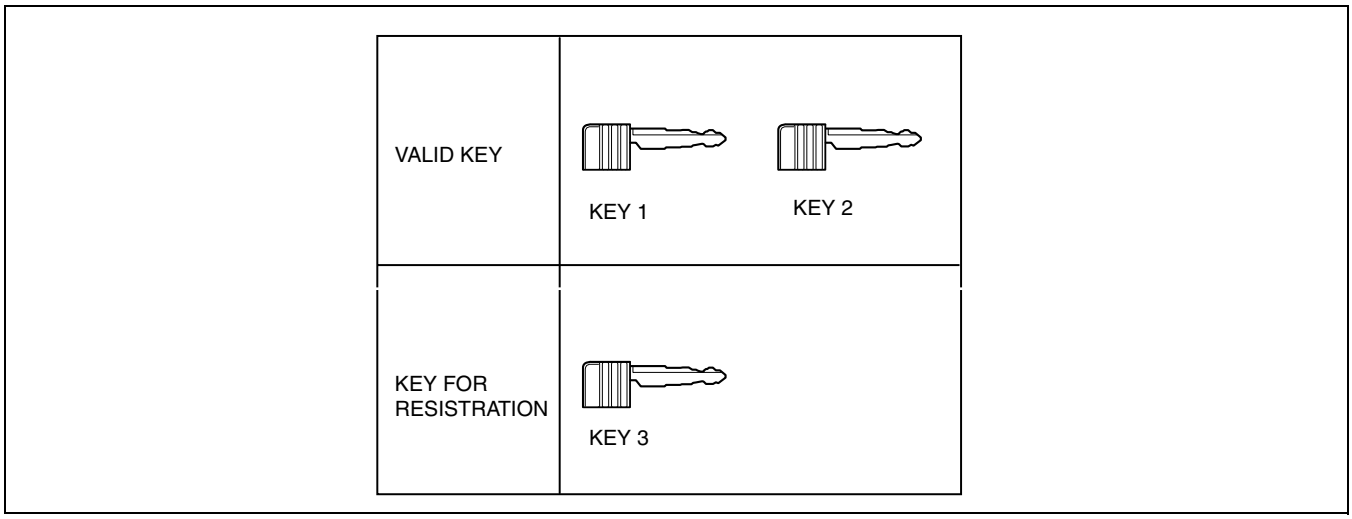
**No.1 Additional Key Programming Procedure (Using Two Valid Keys)**

**Caution**
- **Do not place the following devices in the vehicle while programming, otherwise programming cannot be performed:**
  - **— Card key**
  - **— M-MDS**
  - **— Personal computer**
  - **— Devices that can send/receive the radio waves**

**Condition**
- Have two or more valid keys.

**Note**
- A maximum of eight keys can be programmed for one vehicle. If key programming is not successful and DTC 15 appears even though the procedure was performed properly, use the PID/data monitor function of the M-MDS and verify the number of keys that have been programmed.
- If eight keys have already been programmed, and it is necessary to program other keys, the previously programmed key ID numbers must first be cleared. To clear the key, refer to “09-14-13 No.1 Additional Key Programming Procedure (Using Two Valid Keys)”.

**Procedure**

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1. Prepare key 3 for programming.
2. Start the engine using key 1.
3. Verify that the security light illuminates for **approx. 3 s**, and then goes out.
4. Turn the ignition switch to the LOCK position.
5. Using key 1, turn the ignition switch to the ON position.
6. Verify that the security light illuminates for **approx. 3 s**, and then goes out.
7. Using key 1, turn the ignition switch to the LOCK position **within approx. 4 s** after the security light goes out.
8. Remove key 1.
9. Repeat Steps 2—5 using key 2 instead of key 1.
10. Repeat Steps 5—8 using key 3 instead of key 1.
11. If additional keys need to be programmed, repeat Steps 1—10, and replace key 3 in Step 10 with the key to be programmed (key 4).

**No. 2 Key Additional Programming Procedure (Using the M-MDS)**
**Condition**

- There is only one valid key. Or, there is no valid key but there is a card key that can start the engine.

**Note**

- A maximum of eight keys can be programmed for one vehicle. If key registration is not successful and DTC 15 appears even though the procedure was performed properly, use the PID/data monitor function of the M-MDS and verify the number of keys that have been programmed.
- If eight keys have already been programmed, and it is necessary to program other keys, the previously programmed key ID numbers must first be cleared. To clear the key ID number, refer to “09-14-13 No.1 Additional Key Programming Procedure (Using Two Valid Keys)”.

**Procedure**

1. Prepare key 1 for programming.
2. Start the engine using a valid key or card key.

**Caution**

- **Do not place the card key in the vehicle when starting the engine with the valid key, otherwise programming cannot be performed. If the engine is started with the card key, remove the card key from the vehicle after the engine is started.**

3. Verify that the security light illuminates for **approx. 3 s**, and then goes out.
4. Turn the ignition switch to the LOCK position.
5. Connect the M-MDS to the DLC-2. (See 09-14-11 Foreword.)
6. Using key 1, turn the ignition switch to the ON position.

**Note**

- Although the security light flashes and DTC 15 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

7. Select “BODY/SECURITY/PATS (immobilizer) function” from the M-MDS screen menu.
8. Select “Ignition key additional programming” from the M-MDS screen menu.

**Note**
- After selecting the above menu, “operation is successful” is displayed. At this point, the key that turned the ignition switch to the ON position is completely programmed.

- In this procedure, the necessary number of the keys are completely programmed. To finish the additional key programming, go to Step 13.
- If additional keys need to be programmed, go to the next step.

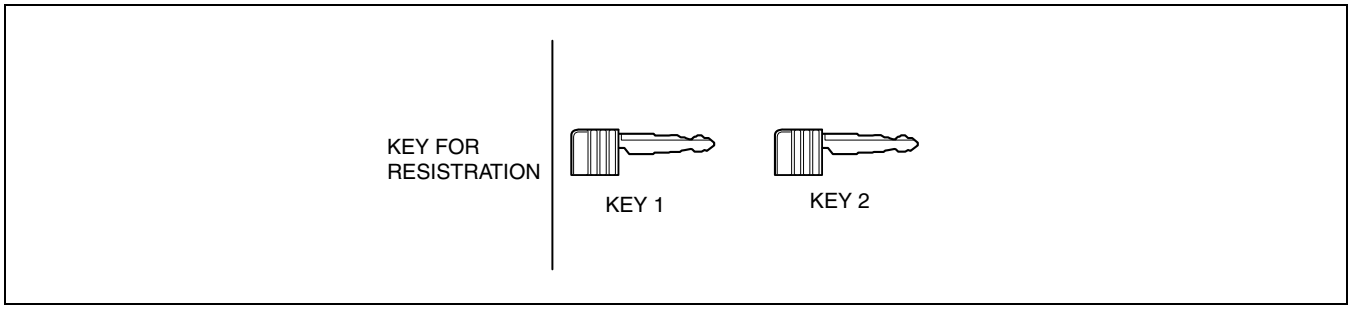
9. Perform the security access according to the directions on the M-MDS screen.
10. After verifying that the PATS function menu is displayed again on the M-MDS screen, turn the ignition switch to the LOCK position and remove key 1.
11. Using the key to be programmed, turn the ignition switch to the ON position.
12. Return to the Step 6.
13. After verifying that the PATS function menu is displayed again on the M-MDS screen, select the “Finish (this menu)” to finish the M-MDS procedure.
14. After Step 10, wait **5 s or more**, and then turn the ignition switch to the LOCK position.

**No.3 PCM Replacement Procedure**
**Condition**
- Have two or more keys to be programmed after the key ID number clearing.

**Caution**
- **Before starting Step 1, complete the procedure for PCM replacement.**

**Procedure**



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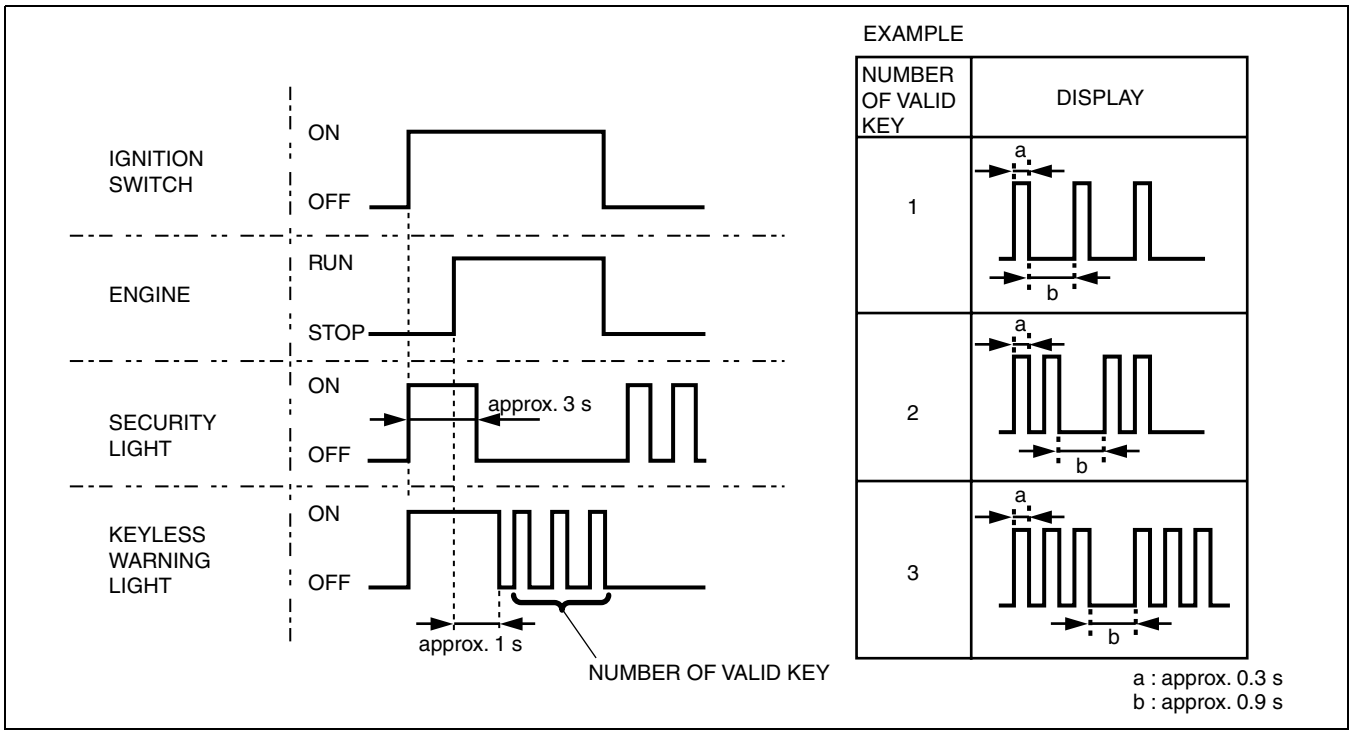
1. Prepare two or more keys to be programmed after the key ID number clearing.
2. Connect the M-MDS to the DLC-2. (See 09-14-11 Foreword.)
3. Using key 1, turn the ignition switch to the ON position.

**Note**
- Although the security light flashes and DTC 15 or 21 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

4. Verify that the keyless warning light illuminates for **approx. 3 s**, and then goes out.
5. Select “BODY/SECURITY/PATS (immobilizer) function” from the menu.
6. Perform the security access according to the direction of the M-MDS screen.
7. Select “Parameter Reset” from the M-MDS screen menu.
8. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)” to finish the M-MDS procedure.
9. After Step 8, wait **5 s or more**, and then turn the ignition switch to the LOCK position.
10. Using key 1, turn the ignition switch to the ON position.
11. After verifying that the security light and keyless warning light illuminates **for 3 s or more** turn the ignition switch to the LOCK position and remove key 1.

**Note**
- Although the security light flashes and DTC 21 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

12. Using key 2, turn the ignition switch to the ON position.
13. Verify that the security light and keyless warning light illuminates **for approx. 3 s**, and then goes out.
14. After verifying that the security light goes out, turn the ignition switch to the LOCK position using key 2, and then remove key 2.
15. If an additional key needs to be programmed, repeat Steps 13—14 with the additional key being key 3. If the ignition switch is held in the ON position **for 1 min or more**, the additional key programming procedure according to Steps 13—14 will not be possible. If this occurs, refer to "09-14-13 M-MDS Connecting Procedure" to register any additional keys.
16. Start the engine with the key 1.
17. Verify that the security light and keyless warning light operate as follows:
    - From the point when the ignition switch is turned to the ON position, the security light illuminates **for approx. 3 s** and goes out.
    - The keyless warning light illuminates with the ignition switch turned to the ON position, and after **approx. 1 s** after the engine is started, it goes out and displays the number of programmed keys.

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18. After verifying that the keyless warning light goes out, turn the ignition switch to the LOCK position using key 1.
19. Repeat Steps 17—18 using key 2 instead of key 1.

**Note**
- Perform Steps 17—18 as well when there are three or more programmed keys.

20. Start the engine with the card key and remove any key from the key cylinder.

**Caution**
- **Remove any key from the key cylinder.**

21. Verify that the security light and keyless warning light operate as follows:
    - From the point when the ignition switch is turned to the ON position, the security light illuminates **for approx. 3 s**, and goes out.
    - The keyless warning light illuminates when the ignition switch is turned to the ON position, and after **approx. 1 s** after the engine is started, it goes out.
22. Turn the ignition switch to the LOCK position after verifying that the keyless warning light goes out.

**No. 4 Key Additional Programming Procedure Changing**

**Note**
- This procedure is performed for enabling/diabling the “No.1 Additional Key Programming Procedure (Using Two Valid Keys)” setting.
- This procedure is possible when the vehicle is new, and when replacing the keyless unit with a new one.
- If “No.1 Additional Key Programming Procedure (Using Two Valid Keys)” is set to disable, the additional key programming can be only performed using the M-MDS preventing the forging of a spare key by using two keys that can start the engine. This function is for use by rental car agencies or other companies with vehicle fleets.

**Procedure**
1. Using the key, turn the ignition switch to the ON position. (The key can be either the valid key or an unprogrammed key)

**Note**
- Although the security light flashes and DTC 15 is displayed when an unprogrammed key is used, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

2. Connect the M-MDS to the DLC-2.
3. Select “BODY/SECURITY/PATS (immobilizer) function” from the M-MDS screen menu.
4. Select “Customer spare key programming enable” or “Customer spare key programming disable” from the M-MDS screen menu. The key additional programming procedure is as follows according to the selected menu:

| Setting | Additional key programming procedure | |
|---|---|---|
| | Method using two valid keys | Method using the M-MDS |
| Customer spare key programming enable | – | – |
| Customer spare key programming disable | x | – |

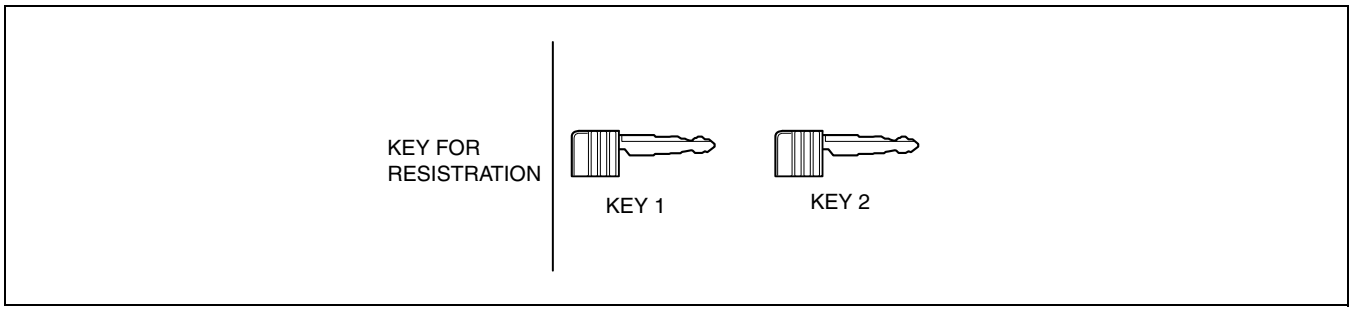
– : Available
x : Unavailable

5. Perform the security access according to the directions on the M-MDS screen.
6. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)” to finish the M-MDS procedure.
7. After Step 6, wait **5 s or more** and then turn the ignition switch to the LOCK position.

**No.5 Resetting Procedure for the Immobilizer System when Replacing the related parts**
**Condition**
- When the keyless control module is replaced
  — Have one or more card keys to be programmed after the replacement.
  — Have two or more keys to be programmed after the replacement.
- When the keyless control module is not to be replaced
  — Have one or more card keys to be programmed.
  — Have two or more keys to be programmed after the replacement.

**Caution**
- **Perform the procedures in the following order: “Key ID number clearing”, “Card key programming”, “Steering lock unit programming”, and “Key programming”. If there is a failure in the programming, the engine may not be started.**

**Procedure**

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1. Prepare two or more keys to be programmed after the key ID number is cleared.
2. Connect the M-MDS to the DLC-2. (See 09-14-11 Foreword.)
3. Using key 1, turn the ignition switch to the ON position.
4. Verify that the keyless warning light illuminates for **approx. 3 s** and then goes out.
5. Select “BODY/SECURITY/PATS (immobilizer) function” from the M-MDS screen menu.
6. Select “Ignition key CODE erase” from the M-MDS screen menu and perform the procedure according to the M-MDS screen.
7. Perform the security access according to the directions on the M-MDS screen.

**Caution**
- **The M-MDS displays “At least two or more keys must be programmed”, however, do not perform the key programming and proceed to Step 8. If the procedure is not followed, the engine may not be started.**
  **The key programming procedure is performed at Step 13—16.**

8. Select “Parameter Reset” from the M-MDS screen menu.
9. Perform security access again as indicated on the M-MDS screen.
10. Select the replaced part as indicated on the M-MDS screen.
    - When replacing only the PCM: Select “PCM”.
    - When replacing only the keyless control module: Select “RKE”.

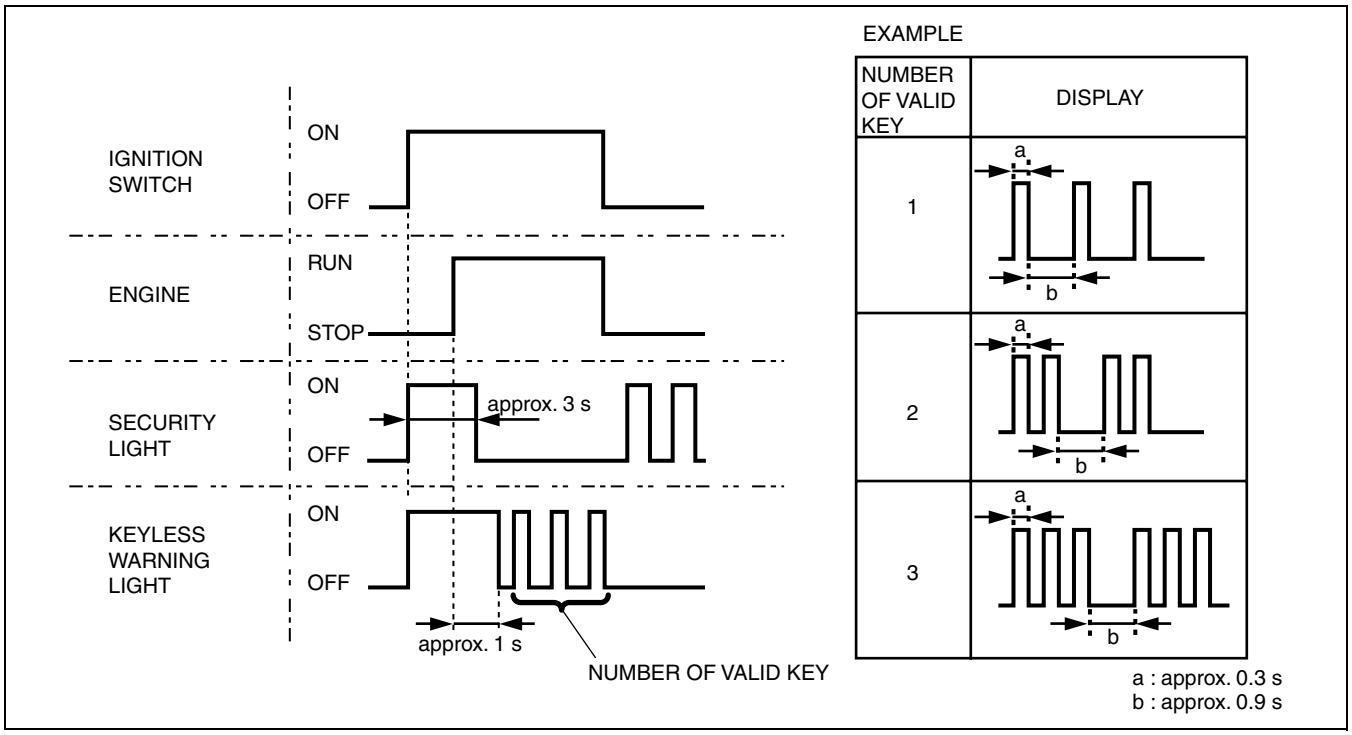
**Note**
- At this time, do not select any other parts from the M-MDS screen menu.

11. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Finish (this menu)” to finish the M-MDS procedure.
12. After Step 11, wait **5 s or more** and then turn the ignition switch to the LOCK position.
13. Using key 1, turn the ignition switch to the ON position.
14. After verifying that the security light and keyless warning light illuminate **for 3 s or more**, turn the ignition switch to the LOCK position and remove key 1.

**Note**
- Although the security light flashes and DTC 21 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

15. Using key 2, turn the ignition switch to the ON position.
16. Verify that the security light and keyless warning light illuminate **for approx. 3 s**, and then goes out.
17. After verifying that the security light goes out, turn the ignition switch to the LOCK position using key 2, and then remove key 2.
18. If additional keys need to be programmed, repeat Steps 13—14 with the additional key to be programmed being key 3. If the ignition switch is held in the ON position **for 1 min or more**, additional key programming according to Steps 13—14 will not be possible. If this occurs, refer to “09-14-13 M-MDS Connecting Procedure” to program any additional keys.
19. Start the engine with key 1.

20. Verify that the security light and keyless warning light operate as follows:
    - From the point when the ignition switch is turned to the ON position, the security light illuminates **for approx. 3 s**, and goes out.
    - The keyless warning light illuminates when the ignition switch is turned to the ON position, and the light goes out after **approx. 1 s**, and then displays the number of the programmed keys.

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21. After verifying that the keyless warning light goes out, turn the ignition switch to the LOCK position using key 1, and then remove the key.
22. Repeat Steps 20—21 using key 2 instead of key 1.

**Note**
- Perform Steps 20—21 as well when three or more keys are to be programmed.

23. Start the engine using the card key.

**Caution**
- **Remove any key from the key cylinder.**

24. Verify that the security light and keyless warning light operate as follows:
    - From the point that ignition switch is turned to the ON position, the security light illuminates **for approx. 3 s**, and goes out.
    - The keyless warning light illuminate when the ignition switch is turned to the ON position for **approx. 1 min**, and goes out.
25. After verifying that the keyless warning light goes out, turn the ignition switch to the LOCK position.

## IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM]

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**Foreword**

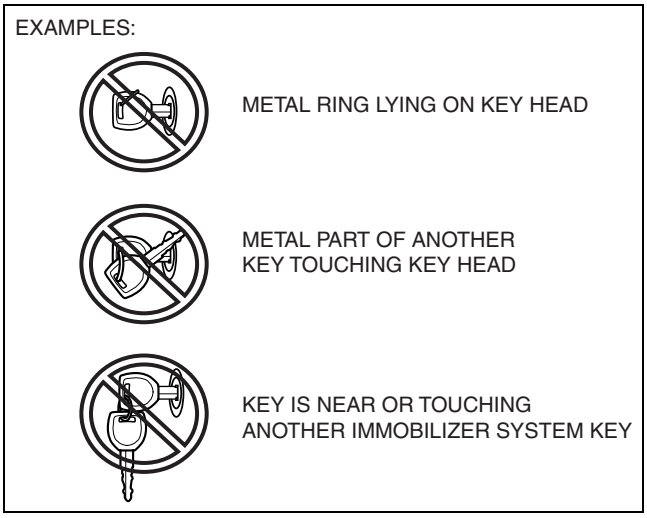
- When performing the following procedures, the immobilizer resetting procedure using the M-MDS must also always be performed: “instrument cluster replacement”, “PCM replacement”, “instrument cluster and PCM joint replacement”, “Key ID number clearing”. The engine will not start unless all work is performed using the M-MDS.
- There are two methods for registering an additional key: Using the M-MDS and using two keys that are able to start the engine.
- When replacing any of the immobilizer system component parts, adding/erasing keys or performing other functions, refer to the following table and perform the applicable procedure (No.1 to 5).

| Reference number | Situation | Required items | Cautionary notes |
|---|---|---|---|
| 1 | Making a spare key when the customer has two or more keys that can start the engine. Or registering an additional key. | • Registration key | • If the additional key registration method has been changed to “Customer spare key programming disabled” (inhibiting the method that uses two keys that are able to start the engine), the M-MDS is required when registering the additional key. In that case, perform procedure No.2. |
| 2 | Making a spare key when the customer has one key that can start the engine or no keys. Or registering an additional key. | • Registration key<br>• M-MDS | - |
| 3 | Clearing previously registered key ID numbers. | • Registration keys (two or more)<br>• M-MDS | • All the key ID numbers registered in the vehicle will be cleared.<br>• Unless keys are re-registered after clearing the key ID numbers, the engine cannot be started. Before beginning the procedure, verify that the customer has turned in all of the keys for the vehicle.<br>• Unless two or more keys are registered after replacement, the engine cannot be started.<br>• The keys (two or more keys) readied before beginning the procedure do not have to be new keys. Any key that is capable of starting the engine before beginning the procedure can be used. |
| 3 | Replace all the keys. (Key cylinder replacement) | • Registration keys (two or more)<br>• M-MDS | • When replacing the key cylinder, have two or more keys ready for registration before beginning the procedure, since the previous keys will be invalid. |
| 4 | Changing the method for registering additional keys. (Method for registering other keys using two keys that can start the engine is disabled.) | • M-MDS | • After performing this procedure it is not possible to register additional keys according to procedure No.1. The system can be returned to the original setting. The M-MDS must always be used to change the system setting. |
| 4 | Changing the method for registering additional keys. (Method for registering other keys using two keys that can start the engine is enabled.) | • M-MDS | • This is the default setting on new vehicles. |
| 5 | Replacing the instrument cluster. | • Replacement instrument cluster<br>• Registration keys (two or more)<br>• M-MDS | • Unless keys are registered after replacing the steering lock, the engine cannot be started. Before beginning the procedure, verify that the customer has turned in all of the keys for the vehicle.<br>• Unless two or more keys are registered after replacement, the engine cannot be started.<br>• The keys (two or more keys) readied before beginning the procedure do not have to be new keys. Any key that is capable of starting the engine before beginning the procedure can be used. |
| 5 | Replacing the PCM. | • Replacement PCM<br>• M-MDS | - |

| Reference number | Situation | Required items | Cautionary notes |
|---|---|---|---|
| 5 | Replacing the PCM and instrument cluster. | • Replacement PCM<br>• Replacement instrument cluster<br>• Registration keys (two or more)<br>• M-MDS | • Unless keys are registered after replacing the steering lock, the engine cannot be started. Before beginning the procedure, verify that the customer has turned in all of the keys for the vehicle.<br>• Unless two or more keys are registered after replacement, the engine cannot be started.<br>• The keys (two or more keys) readied before beginning the procedure do not have to be new keys. Any key that is capable of starting the engine before beginning the procedure can be used. |
| - | Replacing the coil antenna. | • New coil antenna | • It is not necessary to reset the immobilizer system. |

**Caution**

- **If any of the following items are touching or near the key head, signal communication between the key and vehicle is negatively affected, resulting in the engine not starting or the key registration failure. Do not perform the procedure if any of the following items are touching or near the key head.**
  - **— Any metallic object**
  - **— Spare keys or keys for other vehicles equipped with an immobilizer system**
  - **— Any electronic device, or any credit or other cards with magnetic strips**



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**Note**

- Within the following procedures, the term a “valid key” means a “key that can start the engine”.
- After adding/registering keys, clearing ID numbers or replacing any component part of the immobilizer system, verify that all keys can start the engine **within 5 s**.
- When verifying that the keys can start the engine, wait at least **5 s or more** between inserting them.
- If the engine cannot be started using a registered key, repeat the procedure from the beginning.
- Do not start the engine until the key registration procedure for all the necessary keys is completed. If the engine is started during the registration procedure, registration is stopped at that point. Repeat the procedure starting from the beginning if the engine is started before completion.
- Two or more key ID numbers must be registered for the engine to start.
- A maximum of eight key ID numbers can be registered for one vehicle. The M-MDS can be used to verify the number of key ID numbers registered to a single vehicle.
- Do not select screen menus of the M-MDS that are not indicated within the procedures.

**No.1 Additional Key Registration Procedure (Using Two Valid Keys)**

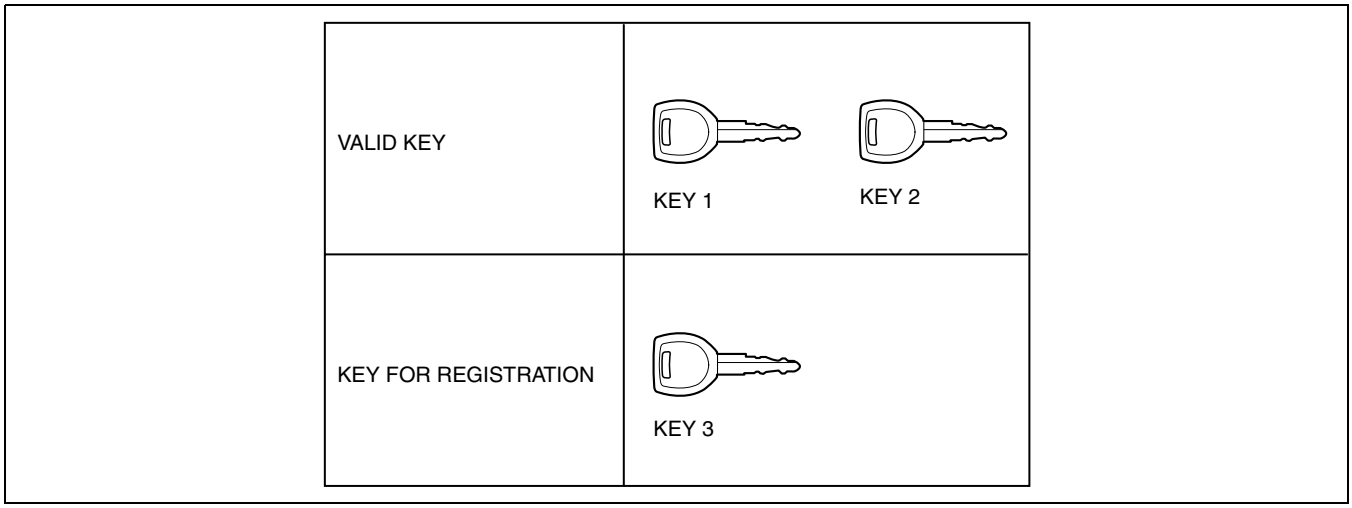
**Conditions**

- Customer has two or more valid keys.

**Note**

- A maximum of eight keys can be registered for any one vehicle. If key registration is not successful and DTC 15 appears even though the procedure was performed properly, use the PID/data monitor function of the M-MDS and verify the number of keys that have been registered.
- If eight keys have already been registered, and it is necessary to register other keys, the previously registered key ID numbers must first be cleared. To clear the key ID numbers, refer to “09-14-23 No.3 Key Replacement Procedure (Clearing Previously Registered Key ID Numbers, Key Re-registration)”.

**Procedure**

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1. Have one key (key 3) ready for registration.
2. Using key 1, turn the ignition switch to the ON position.
3. Verify that the security light illuminates for **approx. 3 s** and then goes out.
4. Using key 1, turn the ignition switch to the LOCK position **within approx. 4 s** after the security light goes out.
5. Remove key 1
6. Repeat Steps 2— 5 using key 2.
7. Repeat Steps 2— 5 using key 3.
8. If additional keys need to be registered, repeat Steps 1— 7 in the same manner as key 3.

**No.2 Additional Key Registration Procedure (Using the M-MDS)**

**Conditions**

- Customer has only one valid key. Or customer has no valid keys. (Can also be performed even if there are two or more valid keys)

**Note**

- A maximum of eight keys can be registered for any one vehicle. If key registration is not successful and DTC 15 appears even though the procedure was performed properly, use the PID/data monitor function of the M-MDS and verify the number of keys that have been registered.
- If eight keys have already been registered, and it is necessary to register other keys, the previously registered key ID numbers must first be cleared. To clear the key ID numbers, refer to “09-14-23 No.3 Key Replacement Procedure (Clearing Previously Registered Key ID Numbers, Key Re-registration)”.

**Procedure**

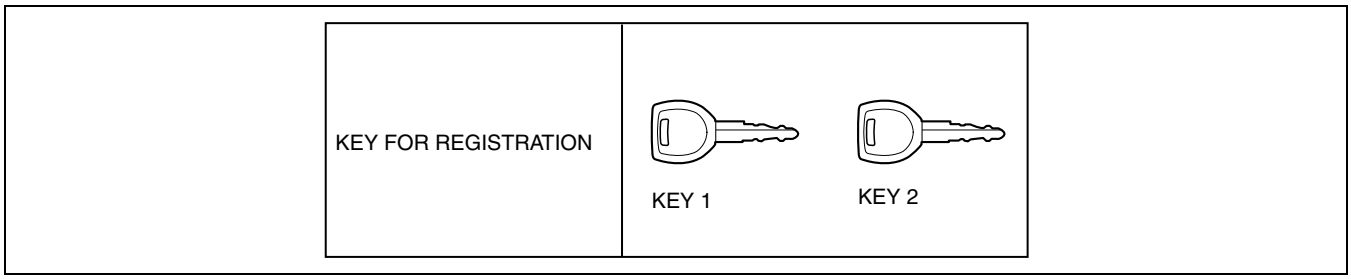
1. Have one key (key 1) ready for registration.
2. Using key 1, turn the ignition switch to the ON position.

**Note**

- Although the security light flashes and DTC 15 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

3. Connect the M-MDS to the DLC-2.
4. Select “Body/Security/PATS function” from the M-MDS screen menu.
5. Perform security access as indicated on the M-MDS screen. (See 09-14-24 No.6 Security Access Procedure.)
6. Select “Program Additional Ignition Key” from the M-MDS screen menu.

**No.3 Key Replacement Procedure (Clearing Previously Registered Key ID Numbers, Key Re-registration) Procedure**

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1. Have two or more keys (key 1, key 2) ready for registration after the clearing the key ID numbers.
2. Using key 1, turn the ignition switch to the ON position.

**Note**
- Although the security light flashes and DTC 15 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

3. Connect the M-MDS to the DLC-2.
4. Select “Body/Security/PATS function” from the M-MDS screen menu.
5. Perform security access as indicated on the M-MDS screen. (See 09-14-24 No.6 Security Access Procedure.)
6. Select “Ignition key ID number Erase” from the M-MDS screen menu and perform the tasks according to the M-MDS screen.

**No.4 Changing the Method for Registering Additional Keys**

**Note**
- This procedure is for changing the enable/disable setting of the “No.1 Additional Key Registration Procedure (Using Two Valid Keys)”.
- The default setting for new vehicles and new instrument cluster replacement is “Enabled”.
- By disabling the “No.1 Additional Key Registration Procedure (Using Two Valid Keys)”, only the M-MDS can be used to register additional keys, thereby preventing two valid keys from being used to create an unauthorized spare key. This function is for use by rental car or other companies with vehicle fleets.



**Procedure**

1. Using any key, turn the ignition switch to the ON position. (Either a valid or an unregistered key can be used.)

**Note**
- When using an unregistered key, although the security light flashes and DTC 15 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

2. Connect the M-MDS to the DLC-2.
3. Select “Body/Security/PATS function” from the M-MDS screen menu.
4. Perform security access as indicated on the M-MDS screen. (See 09-14-24 No.6 Security Access Procedure.)
5. Select either “Customer Spare Key Programming Enable” or “Customer Spare Key Programming Disable” from the M-MDS screen menu. Depending on the selected menu, the additional key registration method is as shown below:

| Setting | Additional key registration method | |
|---|---|---|
| | Procedure using two valid keys | Procedure using the M-MDS |
| Customer spare key programming enable | x | x |
| Customer spare key programming disable | - | x |

x : Procedure is possible

- : Procedure is not possible

6. After verifying that the PATS function menu is displayed again on the M-MDS screen, select “Exit” to complete the M-MDS function.
7. After Step 6, wait **10 s or more** and then turn the ignition switch to the LOCK position.

**No.5 Resetting Procedure for the Immobilizer System when Replacing the PCM or Instrument Cluster**

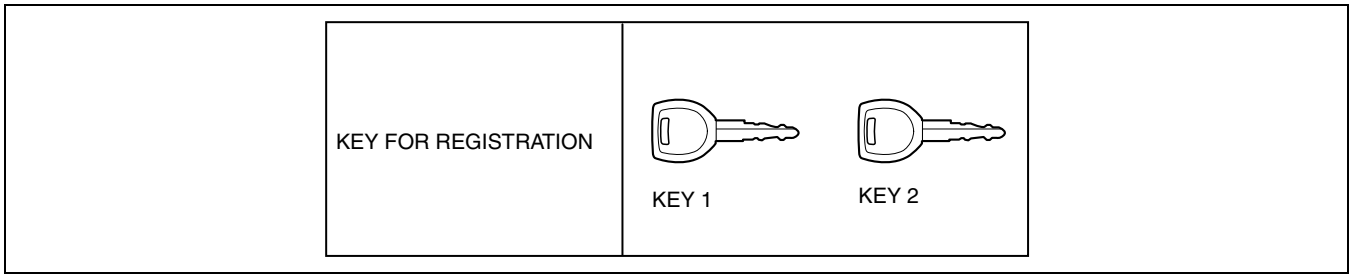
**Conditions**

- When replacing only the PCM: No conditions.
- When replacing only the instrument cluster: Customer has two or more valid keys after replacement tasks.
- When replacing the PCM and the instrument cluster: Customer has two or more valid keys after replacement.

**Caution**

- **When replacing the PCM and the instrument cluster at the same time, follow the same instructions described in the procedure for "when replacing the instrument cluster".**
- **When replacing only the PCM, start from Step 2. Also, when key 1 is indicated within the procedure, any valid key can be used.**
- **Before starting Step 1, complete the procedure for PCM and instrument cluster replacement.**

**Procedure**

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1. Have two or more keys (key 1, key 2) ready for registration.
2. Using key 1, turn the ignition switch to the ON position.

**Note**

- When replacing only the PCM: The security light illuminates **for 3 s** and then goes out.
- When replacing the instrument cluster: Although the security light flashes and DTC 15 is displayed, this does not indicate an improper procedure. Continue to perform the procedure as indicated.

3. Connect the M-MDS to the DLC-2.
4. Select "Body/Security/PATS function" from the M-MDS screen menu.
5. Perform security access as indicated on the M-MDS screen. (See 09-14-24 No.6 Security Access Procedure.)
6. Select "Parameter Reset" from the M-MDS screen menu.
7. Perform security access again as indicated on the M-MDS screen. (See 09-14-24 No.6 Security Access Procedure.)
8. Select the replaced part as indicated on the M-MDS screen.
   - When replacing only the PCM: Select "PCM".
   - When replacing only the instrument cluster: Select "HEC".

**Note**

- At this time, do not select any other parts from the M-MDS screen menu.

9. Perform the tasks according to the M-MDS screen.

**No.6 Security Access Procedure**

**Note**

- Security access must be performed when performing the following functions: "Program Additional Ignition Key", "Ignition Key ID Number Erase", "Customer Spare Key Programming Enable/Disable" and "Parameter Reset".

**Procedure**

1. Connect the M-MDS to the DLC-2.
2. Select "Body/Security/PATS function" from the M-MDS screen menu.
3. Security access is started and the M-MDS displays "Outcode".

**Caution**

- **After reading out the outcode, do not turn ignition switch from LOCK to ON position 5 times, otherwise the outcode value will be changed.**

4. Input the corresponding “Incode” for the “Outcode” displayed on the M-MDS screen.
5. After successfully performing security access, “Program Additional Ignition Key”, “Ignition key ID number Erase” or “Customer Spare Key Programming Enable/Disable” is displayed on the M-MDS screen. When performing “Parameter Reset”, security access is requested two times and after successfully performing it the second time, “Replacement Module” is displayed.

### HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION

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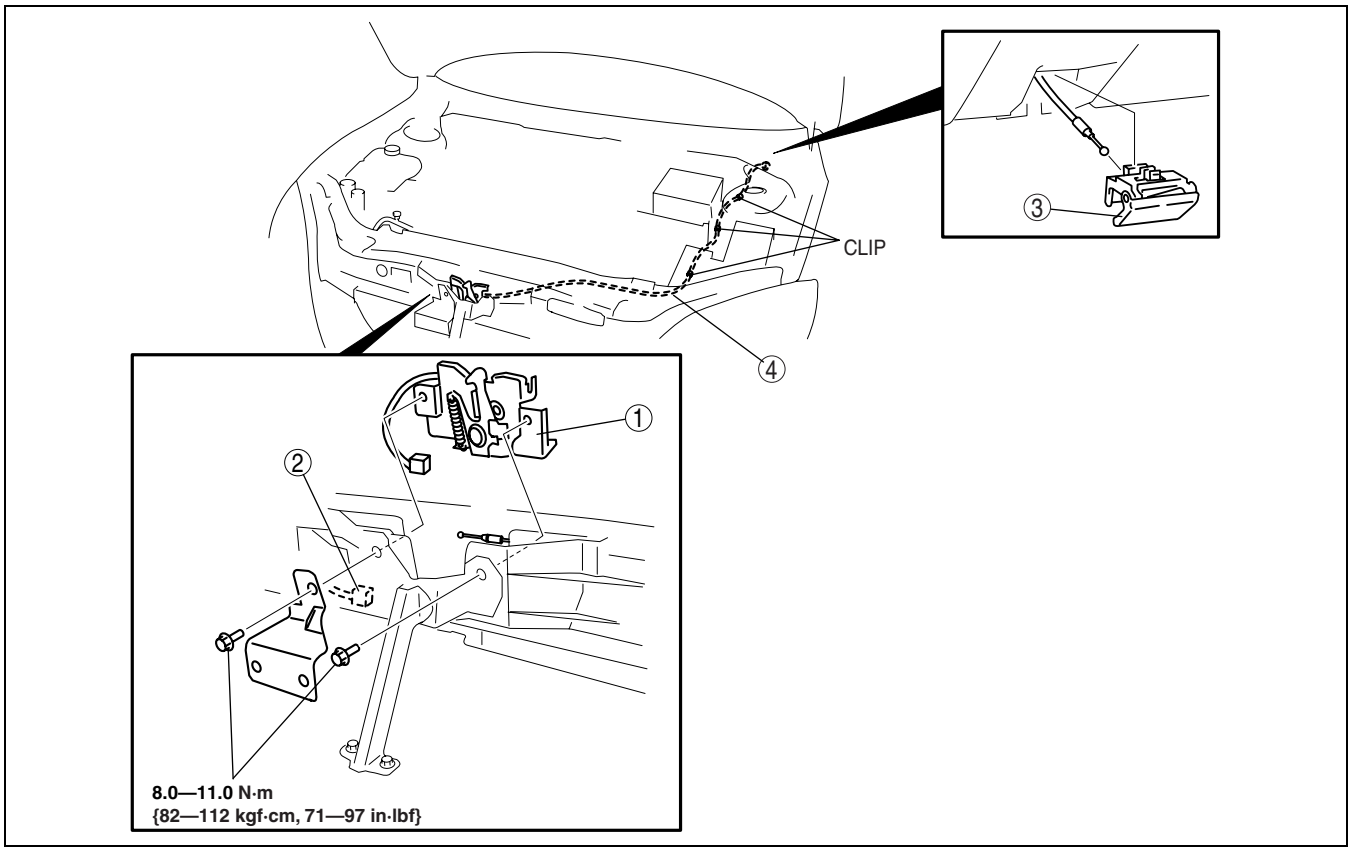
1. To remove the acxuuw00002490od release cable, remove the following parts:
2. Remove in the order indicated in the table.
3. Install in the reverse order of removal.
4. Adjust the acxuuw00002490od. (See 09-10-10 HOOD ADJUSTMENT.)




acxuuw00002490

| | |
|---|---|
| 1 | Hood latch |
| 2 | Hood latch switch connector |

| | |
|---|---|
| 3 | Hood release lever<br>(See 09-14-25 Hood Release Lever Removal Note.) |
| 4 | Hood release cable |

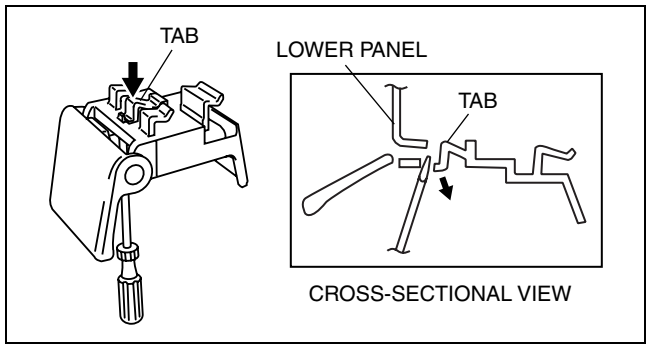
**Hood Release Lever Removal Note**

1. Pull the lever.
2. While pushing the tab in the direction of the arrow using a tape-wrapped, small flathead screwdriver, detach it from the lower panel.

**Caution**

- **Be careful not to damage the acxuuw00002490od release cable when removing the acxuuw00002490od release lever with the flathead screwdriver.**

3. Under the condition in Step 2, pull the acxuuw00002490od release lever outward, then remove it from the lower panel.

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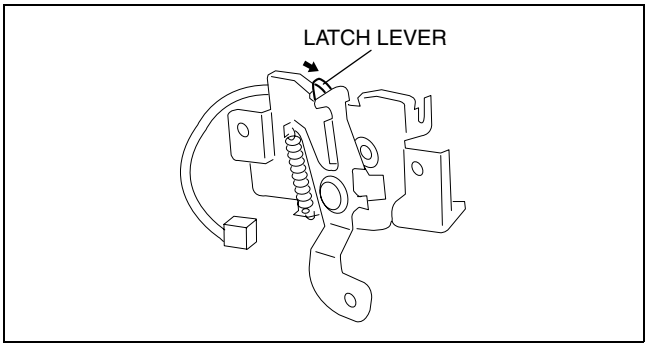
## HOOD LATCH SWITCH INSPECTION

id091400805400

1. When inspecting the latch, press the latch lever using a flathead screwdriver or a similar tool.

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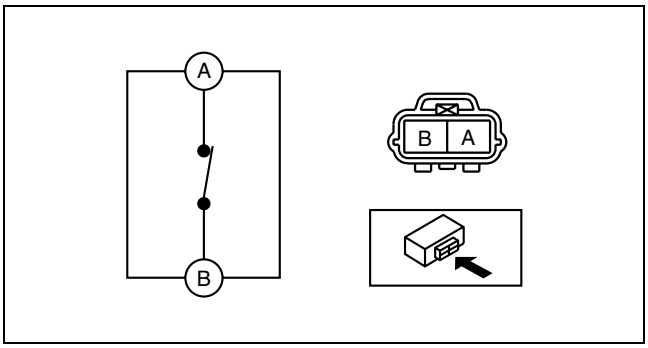
2. Inspect for continuity between the hood latch switch terminals.
   - If not as specified, replace the hood latch.

○—○ : Continuity

| Latch condition | Terminal | |
|---|---|---|
| | A | B |
| Latch (hood is closed) | | |
| Unlatch (hood is open) | ○ | ○ |

acxuuw00002494

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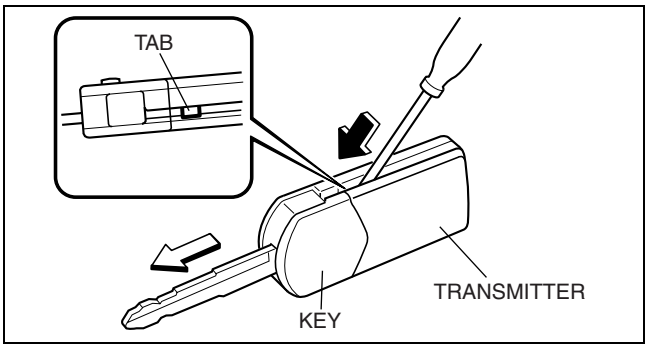
## TRANSMITTER BATTERY REPLACEMENT[KEYLESS ENTRY SYSTEM]

id0914008057b3

1. Insert a small flathead screwdriver into the transmitter notch and remove the key from the transmitter by pressing the tab.

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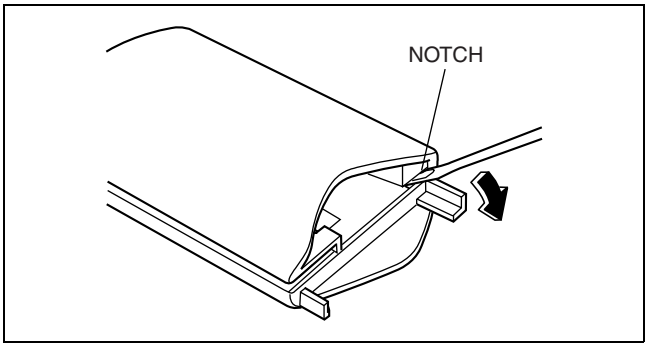
2. Insert a small flathead screwdriver into the transmitter notch and the transmitter.

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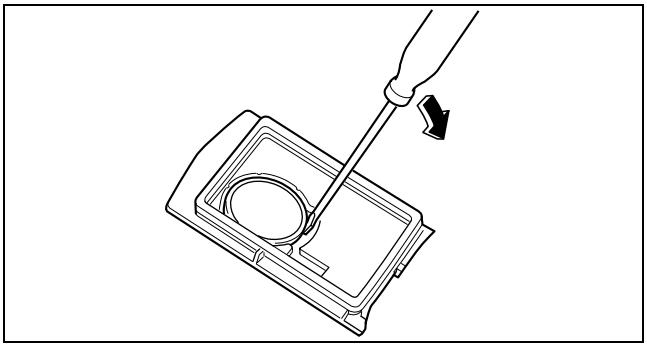
3. Remove the battery.



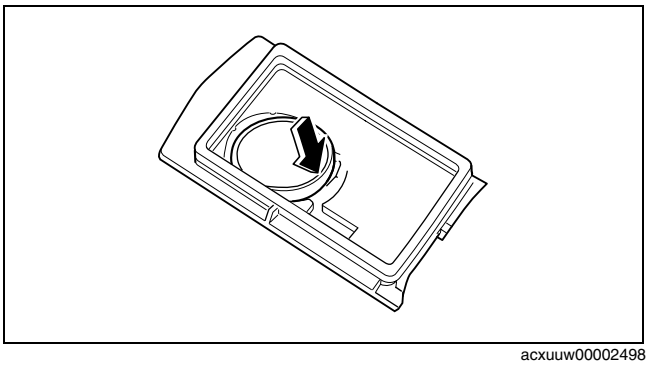
acxuuw00002497

4. Install the new battery (CR1620) with the positive pole facing down.
5. Align the upper and lower cover and close the transmitter.

**Used battery**
**Lithium battery CR1620**

**Battery life**
**Approx. 2 years (when used 10 times/day)**

6. Install the key to the transmitter.



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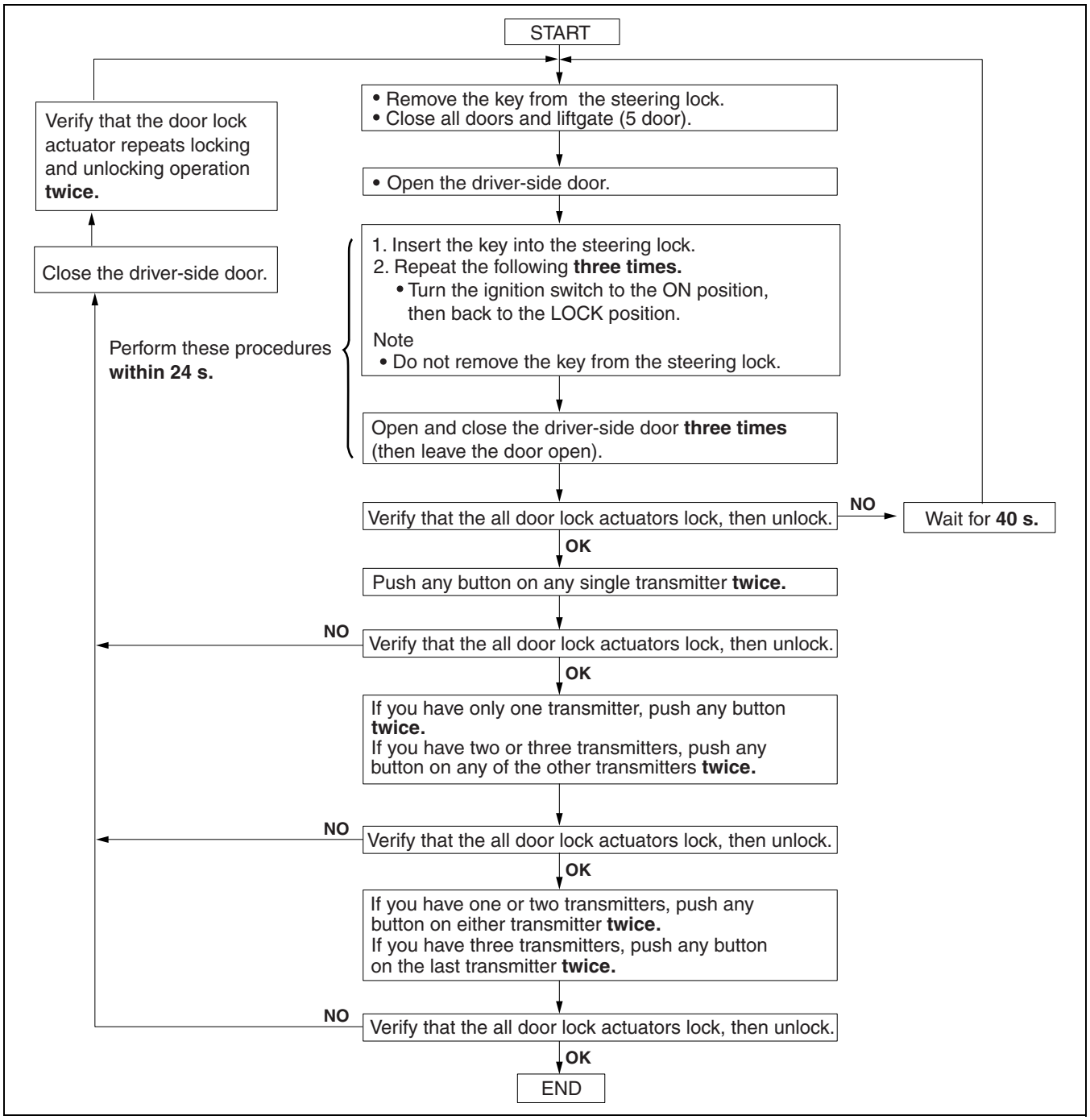
## TRANSMITTER ID CODE REGISTRATION[KEYLESS ENTRY SYSTEM]

id0914008059b3

**Note**

- When registering the ID code into a keyless control module, verify that other transmitters are not being operated in the vicinity.
- After ID code registering, remove the key from the steering lock and verify that all doors lock/unlock normally using the transmitter.

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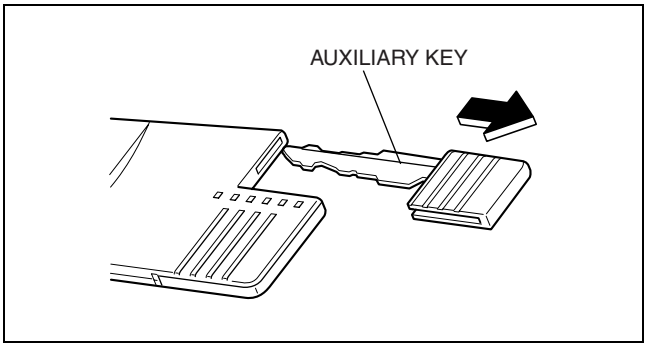
## CARD KEY BATTERY REPLACEMENT[ADVANCED KEYLESS SYSTEM]

id0914008061b1

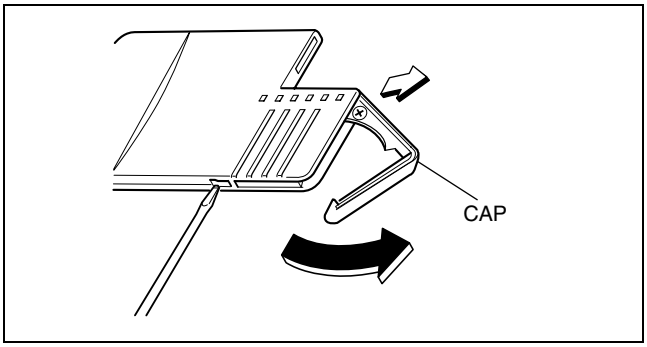
1. Pull out the auxiliary key.




acxuuw00002500

2. Replace the cap using a flathead screwdriver, then rotate and remove the cap.

**Caution**
- **Do not turn the cap excessively. The cap may be damaged.**

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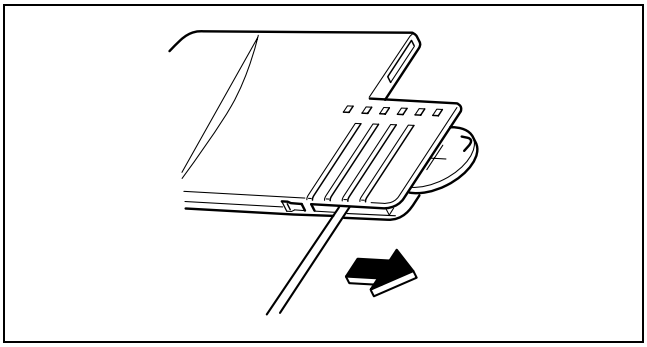
3. Insert a flathead screwdriver into the crack and press the battery out.

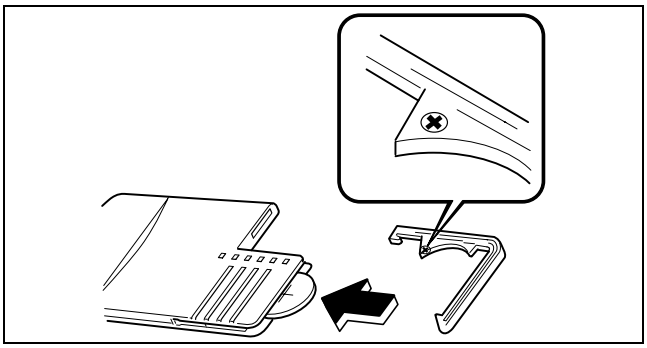


acxuuw00002502

4. Insert the new battery (CR2025) with the positive pole (+) facing the (+) mark on the cap.

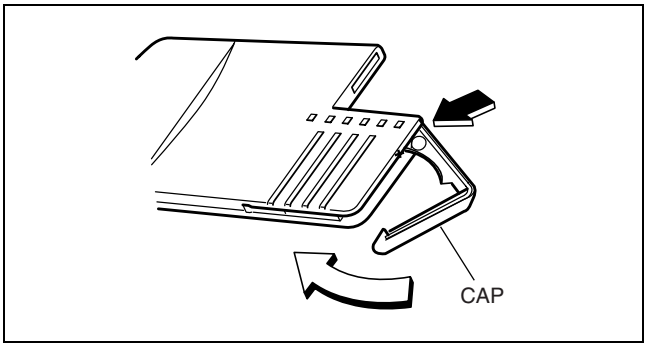
**Battery specification**
**Lithium CR2025 × 1**

**Note**
- The batteries will last about **1 years when used 10 times a day.**



acxuuw00002503

5. Rotate and close the cap.
6. Reinsert the auxiliary key.

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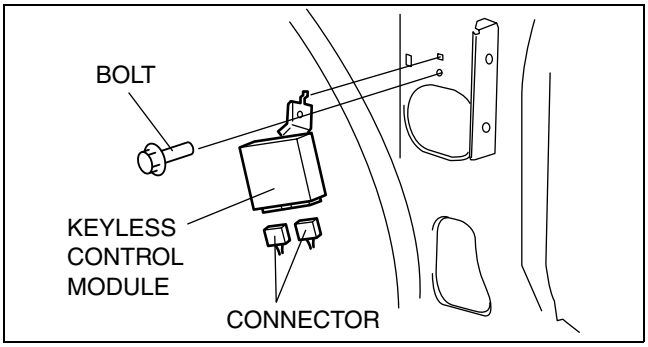
## KEYLESS CONTROL MODULE REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM]

id0914008063b1

**Note**

- If the keyless control module is replaced, always perform the following procedure.
  **Without immobilizer system**
  — Card key programming (See 09-14-34 CLEARING CARD KEY[ADVANCED KEYLESS SYSTEM].)
  — Steering lock unit programming (See 09-14-35 STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].)
  **With immobilizer system**
  — Card key programming (See 09-14-34 CLEARING CARD KEY[ADVANCED KEYLESS SYSTEM].)
  — Steering lock unit programming (See 09-14-35 STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM].)
  — Immobilizer system resetting (with immobilizer system) (See 09-14-11 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[ADVANCED KEYLESS SYSTEM].)

1. Disconnect the negative battery cable.
2. Remove the front side trim. (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
3. Disconnect the keyless control module connector.
4. Remove the bolt, then remove the keyless control module.
5. Install in the reverse order of removal.

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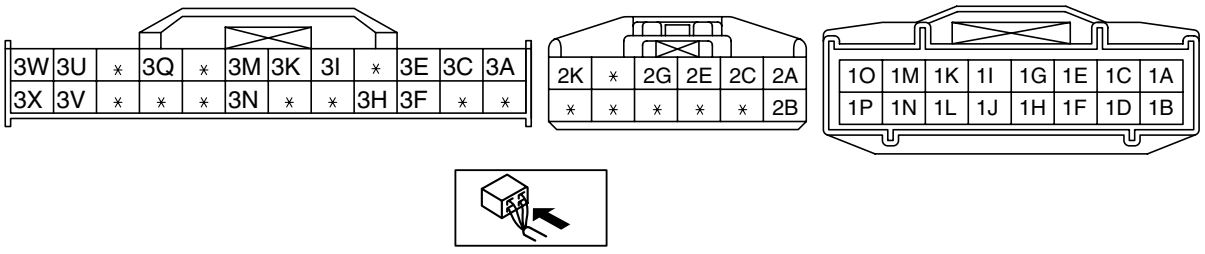
## KEYLESS CONTROL MODULE INSPECTION[ADVANCED KEYLESS SYSTEM]

id0914008064b1

1. Measure the voltage or inspect for continuity according to the Terminal Voltage Table (Reference).
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under “Inspection item(s)” and related wiring harnesses.

**Terminal Voltage Table (Reference)**

KEYLESS CONTROL MODULE WIRING HARNESS SIDE CONNECTOR

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| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item(s) |
|---|---|---|---|---|---|
| 1A | keyless antenna (exterior, LF)(+) | keyless antenna (exterior, LF) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (exterior, LF) |
| 1B | keyless antenna (exterior, LF)(-) | keyless antenna (exterior, LF) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (exterior, LF) |
| 1C | keyless antenna (exterior, RF)(+) | keyless antenna (exterior, RF) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (exterior, RF) |

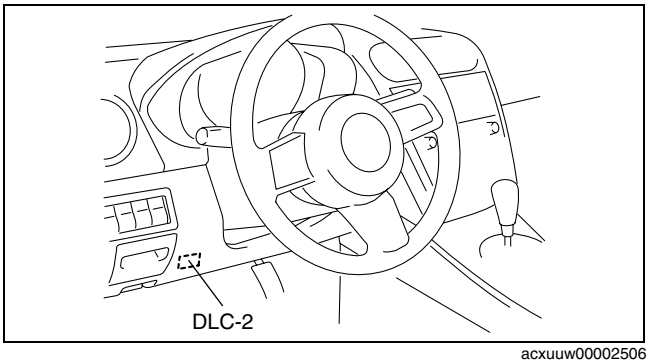
| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item(s) |
|---|---|---|---|---|---|
| 1D | keyless antenna (exterior, RF)(-) | keyless antenna (exterior, RF) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (exterior, RF) |
| 1E | keyless antenna (exterior, rear)(+) | keyless antenna (exterior, rear) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (exterior, rear) |
| 1F | keyless antenna (exterior, rear)(-) | keyless antenna (exterior, rear) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (exterior, rear) |
| 1G | GND | Body ground | Under any condition: Inspect for continuity to ground. | Continuity detected | GND |
| 1H | GND | Body ground | Under any condition: Inspect for continuity to ground. | Continuity detected | GND |
| 1I | keyless antenna (interior, rear)(+) | keyless antenna (interior, rear) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (interior, rear) |
| 1J | keyless antenna (interior, rear)(-) | keyless antenna (interior, rear) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (interior, rear) |
| 1M | keyless antenna (interior, middle)(+) | keyless antenna (interior, middle) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (interior, middle) |
| 1N | keyless antenna (interior, middle)(-) | keyless antenna (interior, middle) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (interior, middle) |
| 1O | keyless antenna (interior, front)(+) | keyless antenna (interior, front) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (interior, front) |
| 1P | keyless antenna (interior, front)(-) | keyless antenna (interior, front) | Under any condition: Inspect for continuity to keyless antenna. | Continuity detected | keyless antenna (interior, front) |
| 2A | Power supply | ROOM 15 A fuse | Under any condition | B+ | ROOM 15 A FUSE |
| 2B | GND | Body ground | Under any condition: Inspect for continuity to ground. | Continuity detected | GND |
| 2C | IG1 | IG1 10 A fuse | Ignition switch is at ON position | B+ | IG1 10 A fuse |
| | | | Ignition switch is at LOCK or ACC position | 1.0 or less | |
| 2E | ACC | METER 7.5 A fuse | Ignition switch is at ACC position | B+ | METER 7.5 A fuse |
| | | | Ignition switch is at LOCK or ON position | 1.0 or less | |
| 2K | Beeper | Keyless beeper | Beeper operated | 1.0 or less | Keyless beeper |
| | | | Other | 5.0 | |
| 3A | Power supply (keyless receiver) | Keyless receiver | Under any condition | B+ | Keyless receiver |
| 3C | Communication (keyless receiver) | Keyless receiver | Under any condition: Inspect for continuity to keyless receiver. | Continuity detected | Keyless receiver |
| 3E | Start knob (push switch) | Steering lock unit | Start knob is Pushed | B+ | Steering lock unit |
| | | | Other | 1.0 or less | |

| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item(s) |
|---|---|---|---|---|---|
| 3F | Key reminder switch | Steering lock unit | Key reminder switch is ON | B+ | Steering lock unit |
| | | | Other | 1.0 or less | |
| 3H | Communication (steering lock unit) | Steering lock unit | Under any condition: Inspect for continuity to steering lock unit. | Continuity detected | Steering lock unit |
| 3E | Request switch input (passenger-side) | Request switch input (passenger-side) | Passenger-side request switch is ON: Inspect for continuity to ground. | Continuity detected | Request switch input (passenger-side) |
| | | | Passenger-side request switch is OFF: Inspect for continuity to ground. | No continuity | |
| 3K | Request switch input (driver-side) | Request switch input (driver-side) | Driver-side request switch is ON: Inspect for continuity to ground. | Continuity detected | Request switch input (driver-side) |
| | | | Driver-side request switch is OFF: Inspect for continuity to ground. | No continuity | |
| 3M | Request switch input (liftgate) | Request switch input (liftgate) | Liftgate request switch is ON: Inspect for continuity to ground. | Continuity detected | Request switch input (liftgate) |
| | | | Liftgate request switch is OFF: Inspect for continuity to ground. | No continuity | |
| 3N | Lock signal input | Door lock-link switch | Driver-side door is locked: Inspect for continuity to ground. | No continuity | Door lock-link switch |
| | | | Driver-side door is unlocked: Inspect for continuity to ground. | Continuity detected | |
| 3Q | Communication (BCM) | BCM | Under any condition: Inspect for continuity to BCM. | Continuity detected | BCM |
| 3U | Tx-SKE | Coil antenna | Ignition switch is at ON position | B+ | Coil antenna |
| | | | Ignition switch is at LOCK or ACC position | 1.0 or less | |
| 3V | Rx-SKE | Coil antenna | Ignition switch is at ON position | B+ | Coil antenna |
| | | | Ignition switch is at LOCK or ACC position | 1.0 or less | |
| 3W | HS-CAN+ | PCM | Under any condition: Inspect for continuity to PCM. | Continuity detected | - |
| 3X | HS-CAN- | PCM | Under any condition: Inspect for continuity to PCM. | Continuity detected | - |

**KEYLESS CONTROL MODULE CONFIGURATION[ADVANCED KEYLESS SYSTEM]**

id0914008068b1

1. Connect the M-MDS to the DLC-2 connector.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Module Programming”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Programmable Module Installation”.
   2. Select “RKE”.
4. Perform the configuration according to the directions on the screen.

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## CARD KEY ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM]

id0914008071b1

**Caution**
- **Do not place the following devices in the vehicle while programming, otherwise programming cannot be performed.**
  - **— M-MDS**
  - **— Personal computer**
  - **— Device that can send/receive radio waves**
- **Verify that the other transmitter is not being operated around the servicing area during card key programming.**

**Note**
- Use the M-MDS and start programming if the condition corresponds to the following:
  - — One or No Programmed Card Keys
  - — Keyless control module is replaced
- If six card keys are already programmed, the programming mode does not activate. If programming is needed, use the M-MDS to erase the unnecessary card key programming.

**With two programmed card keys**

1. Bring the programmed card keys (2) and a unprogrammed card key into the vehicle.
2. Close all doors.
3. Insert the supplementary key into the ignition key cylinder.

**Note**
- Complete the procedures up to Step 7 within **30 s after the supplementary key is inserted.**

4. Turn the ignition switch to the ON position.
5. Press the UNLOCK button on card key 1.
6. Press the UNLOCK button on card key 2.
7. From the ignition switch in the ON position, switch the ignition switch in the order indicated below.
   — ACC→ON→ACC→ON→ACC→ON
8. Open the driver-side front door, press the door switch **twice, and then close the door.**

**Note**
- After Step 3 is completed and the card key programming mode is activated, the door lock actuator operates to lock, and then operates to unlock.
- If the door lock actuator does not operate, repeat the procedure from Step 2.

9. Press the UNLOCK button on the unprogrammed card key **twice.**

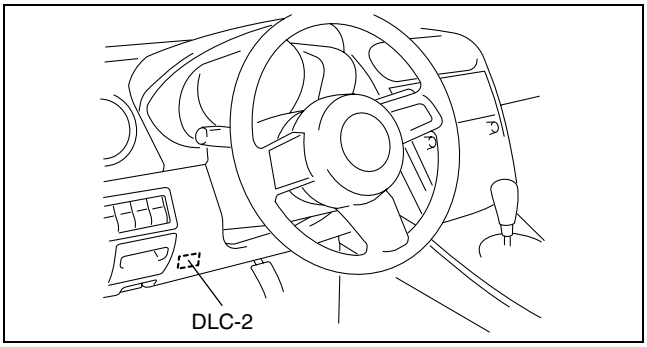
**Note**
- After Step 8 is completed and the card key is programmed, the door lock actuator operates to lock, and then operates to unlock.

10. If programming more card keys, remove the supplementary key once, and then repeat the procedure from Step 2.

**Using M-MDS**

1. Fully lower the driver-side door glass.
2. Connect the M-MDS to the DLC-2.
3. Pull out the M-MDS cable from the door glass opening and set the M-MDS outside the vehicle.

**Caution**
- **Protect the cable and body contact area with a clean rag, otherwise they could be damaged.**

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4. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Body”.
     2. Select “Security”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
5. Then, select items from the screen menu in the following order.
   1. Select “PATS functions”.
   2. Select “Program Additional Card Key”.
6. Security access begins and the M-MDS displays the “OUT-CODE“.

**Note**
- When “OUT-CODE“ is first displayed, turning the ignition switch from the LOCK to the ON position **5 times will change the “OUT-CODE”.**

7. Input the “IN-CODE“ that corresponds to the “OUT-CODE “ displayed on the M-MDS screen.
8. Select “CARD KEY PROGRAMMING“ from the M-MDS screen menu.

**Note**
- After Step 8 is completed and the card key programming is activated, the door lock actuator operates to lock, and then operates to unlock.

9. Press the unprogrammed card key UNLOCK button **twice.**

**Note**
- After Step 9 is completed and the card key is programmed, the door lock actuator operates to lock, and then operates to unlock.

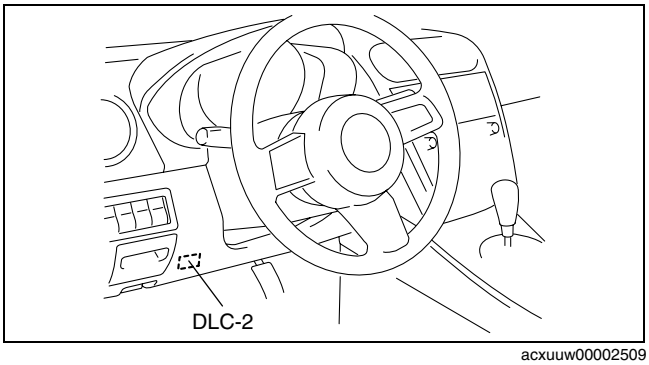
10. If programming more card keys, remove the supplementary key once, and then repeat the procedure from Step 7 by following the instructions on the M-MDS screen.

**CLEARING CARD KEY[ADVANCED KEYLESS SYSTEM]**

id0914008072b1

1. Fully lower the driver-side door glass.
2. Connect the M-MDS to the DLC-2.
3. Pull out the M-MDS cable from the door glass opening and set the M-MDS outside the vehicle.

**Caution**
- **Protect the cable and body contact area with a clean rag, otherwise they could be damaged.**

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4. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Body”.
     2. Select “Security”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
5. Then, select items from the screen menu in the following order.
   1. Select “PATS functions”.
   2. Select “Card Key Code Erase”.
6. Security access begins and the M-MDS displays the “OUT-CODE“.

**Note**
- When “OUT-CODE“ is first displayed, turning the ignition switch from the LOCK to the ON position **5 times will change the “OUT-CODE”.**

7. Input the “IN-CODE“ that corresponds to the “OUT-CODE“ displayed in the M-MDS screen.
8. Select “CARD KEY CLEARING“ from the M-MDS screen menu.

## STEERING LOCK UNIT ID CODE REGISTRATION[ADVANCED KEYLESS SYSTEM]

id0914008073b1

**Caution**

- **Do not place the following devices in the vehicle while programming, otherwise programming cannot be performed.**
  - **— M-MDS**
  - **— Personal computer**
  - **— Device that can send/receive radio waves**

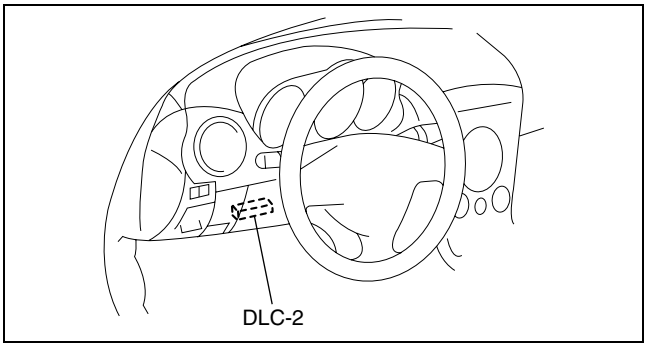
**Note**

- The steering lock unit and steering lock component are a single unit. Therefore, replace the steering lock component when replacing steering lock unit. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
- For this procedure, a programmed card key is necessary. If there is no programmed card key, perform the steering lock unit programming after the card key programming.

1. Bring the programmed card key into the vehicle.
2. Fully lower the driver-side door glass.
3. Connect the M-MDS to the DLC-2.
4. Pull out the M-MDS cable from the door glass opening and set the M-MDS outside the vehicle.
5. Select “BODY/SECURITY/PATS (immobilizer)“ from the M-MDS screen menu.
6. Perform the security access according to the directions on the M-MDS screen.
7. The security access begins and the M-MDS displays “OUT-CODE“.

**Note**

- When “OUT-CODE” is first displayed, turning the ignition switch from the LOCK to the ON position **5 times will change the “OUT-CODE”.**

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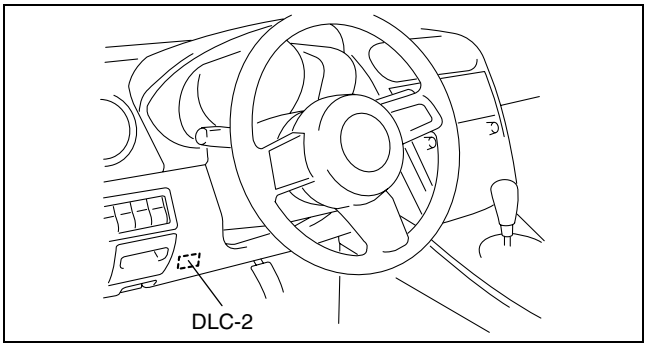
8. Input the “IN-CODE“ that corresponds to the “OUT-CODE“ displayed on the M-MDS screen.
9. Select “STEERING LOCK UNIT PROGRAMMING“ and perform procedures according to the directions on the M-MDS screen.

## CUSTOMIZED FUNCTION SETTING PROCEDURE[ADVANCED KEYLESS SYSTEM]

id0914008074b1

1. Connect the M-MDS to the DLC-2.
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select “Module programming”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
     2. Select “Module programming”.
3. Then, select items from the screen menu in the following order.
   1. Select “Pragrammable Parameters”.
   2. Select “RKE”.
4. Select the item name, and than select either “Disable/Enable”.

   **Items**
   - Automatic Locks
   - Answer Back Buzzer
   - Card Key Battery Low Alarm

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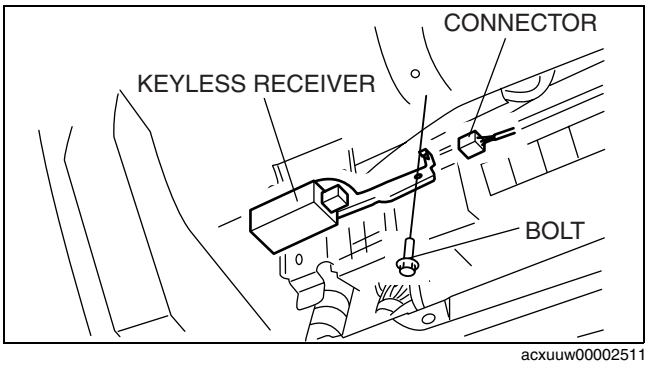
### KEYLESS RECEIVER REMOVAL/INSTALLATION

id091400807500

1. Disconnect the negative battery cable.
2. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
3. Disconnect the keyless receiver connector.
4. Remove the bolt, then remove the keyless receiver.
5. Install in the reverse order of removal.

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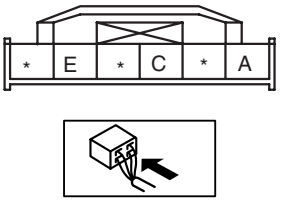
### KEYLESS RECEIVER INSPECTION

id091400807600

1. Measure the voltage or inspect for continuity according to the Terminal Voltage Table (Reference).
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under "Inspection item(s)" and related wiring harnesses.
2. If the system does not work properly even though the inspection items or related wiring harnesses do not have any malfunction, perform symptom troubleshooting [KEYLESS ENTRY SYSTEM].

**Terminal Voltage Table (Reference)**

KEYLESS RECEIVER
WIRING HARNESS-SIDE CONNECTOR

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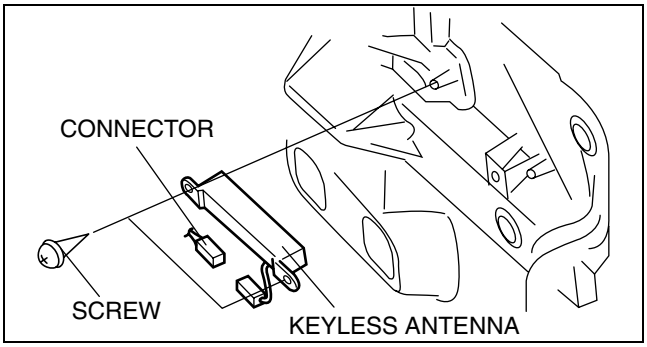
| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item(s) |
|---|---|---|---|---|---|
| A | Power supply | **ADVANCED KEYLESS SYSTEM**<br>• Keyless control module<br>**KEYLESS ENTRY SYSTEM**<br>• BCM | Under any condition | B+ | • Keyless control module<br>• BCM<br>• Related wiring harnesses |
| C | Data | **ADVANCED KEYLESS SYSTEM**<br>• Keyless control module<br>**KEYLESS ENTRY SYSTEM**<br>• BCM | • Under any condition: Inspect the wiring harness between the keyless receiver and BCM terminal 7I for continuity. | Continuity detected | • Keyless control module<br>• BCM<br>• Related wiring harnesses |
| E | GND | Body ground | Under any condition: Inspect for continuity to ground. | Continuity detected | GND |

## KEYLESS ANTENNA REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM]

id0914008077b1

### Exterior, LF/RF

1. Disconnect the negative battery cable.
2. Remove the door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Disconnect the connector, then remove the keyless antenna.
5. Install in the reverse order of removal.

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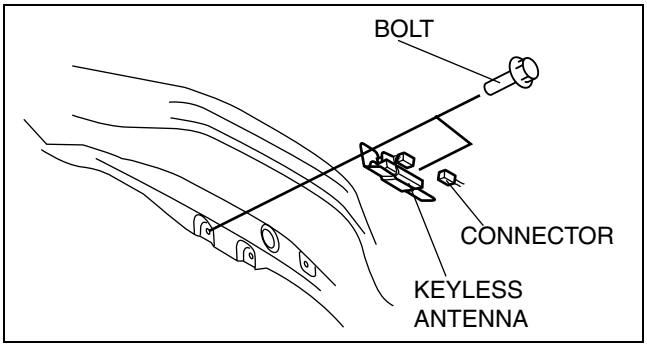
### Exterior, Rear

1. Disconnect the negative battery cable.
2. Remove the bolts.
3. Disconnect the connector, then remove the keyless antenna.
4. Install in the reverse order of removal.

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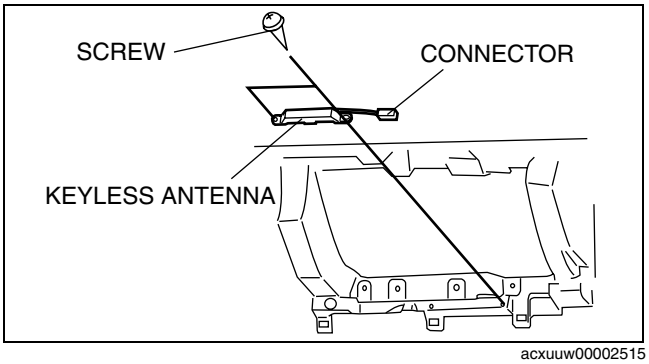
### Interior, Front

1. Disconnect the negative battery cable.
2. Remove the glove compartment. (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
3. Disconnect the connector, then remove the screws.
4. Remove the keyless antenna.
5. Install in the reverse order of removal.

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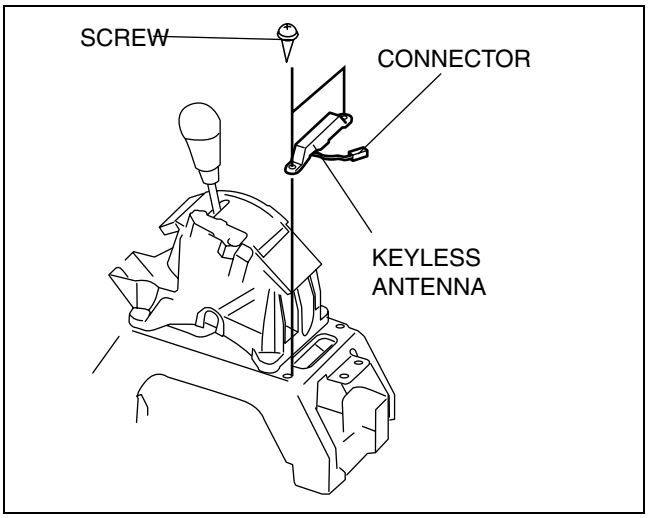
**Interior, Middle**

1. Disconnect the negative battery cable.
2. Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
3. Remove the clips.
4. Disconnect the connector, then remove the keyless antenna.
5. Install in the reverse order of removal.

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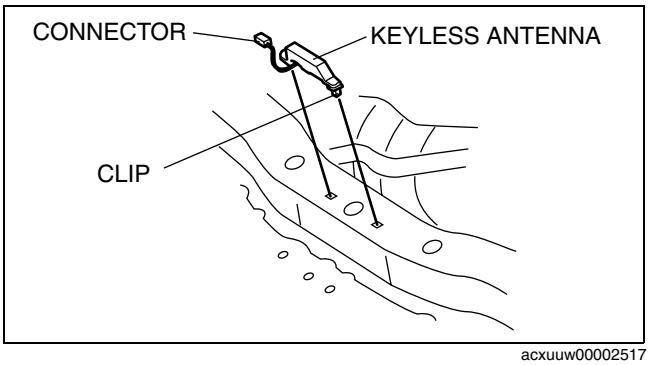
**Interior, Rear**

1. Disconnect the negative battery cable.
2. Remove the rear seat. (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
3. Remove the clips.
4. Disconnect the connector, then remove the keyless antenna.
5. Install in the reverse order of removal.

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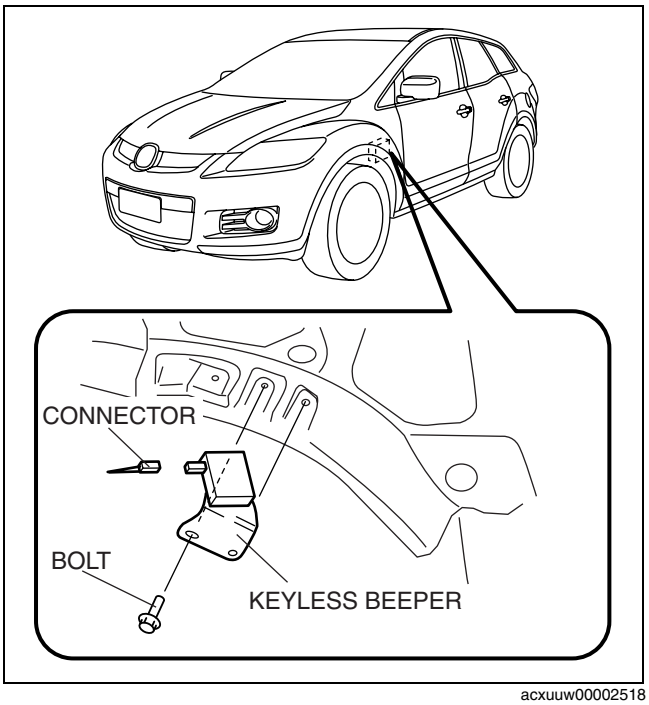
### KEYLESS BEEPER REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM]

id0914008078b1

1. Disconnect the negative battery cable.
2. Remove the mud gurde.
3. Remove the BOLTS.
4. Disconnect the connector, then remove the keyless acxuuw00002518eper.
5. Install in the reverse order of removal.

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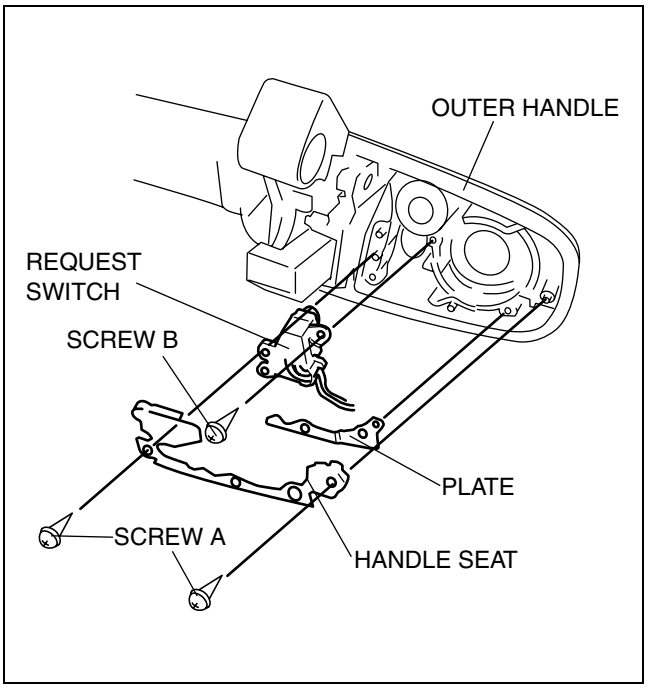
### REQUEST SWITCH REMOVAL/INSTALLATION[ADVANCED KEYLESS SYSTEM]

id0914008079b1

**Driver-side/passenger-side**

1. Disconnect the negative battery cable.
2. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove the front outer handle. (See 09-14-8 FRONT OUTER HANDLE REMOVAL/INSTALLATION.)
4. Remove the screws A, then remove the handle seat and plate.
5. Remove screw B, then remove the request switch.

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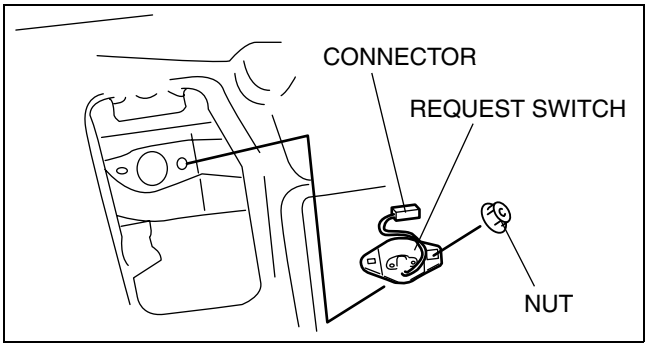
**Liftgate**

1. Disconnect the negative battery cable.
2. Remove the nut, then remove the request switch from the liftgate.
3. Install in the reverse order of removal.

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**REQUEST SWITCH INSPECTION[ADVANCED KEYLESS SYSTEM]**

id0914008080b1

1. Inspect for continuity between request switch terminals A and B.
   - If not as specified, replace the request switch.

○—○ : Continuity

| Switch position | Terminal | |
|---|---|---|
| | A | B |
| Push (ON) | ○ | ○ |
| Not push (OFF) | | |

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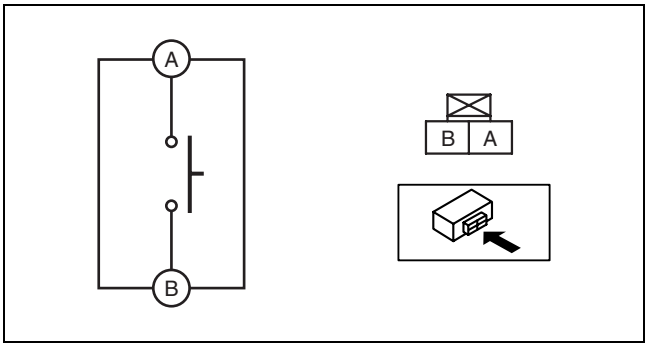


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# 09-15 SUNROOF

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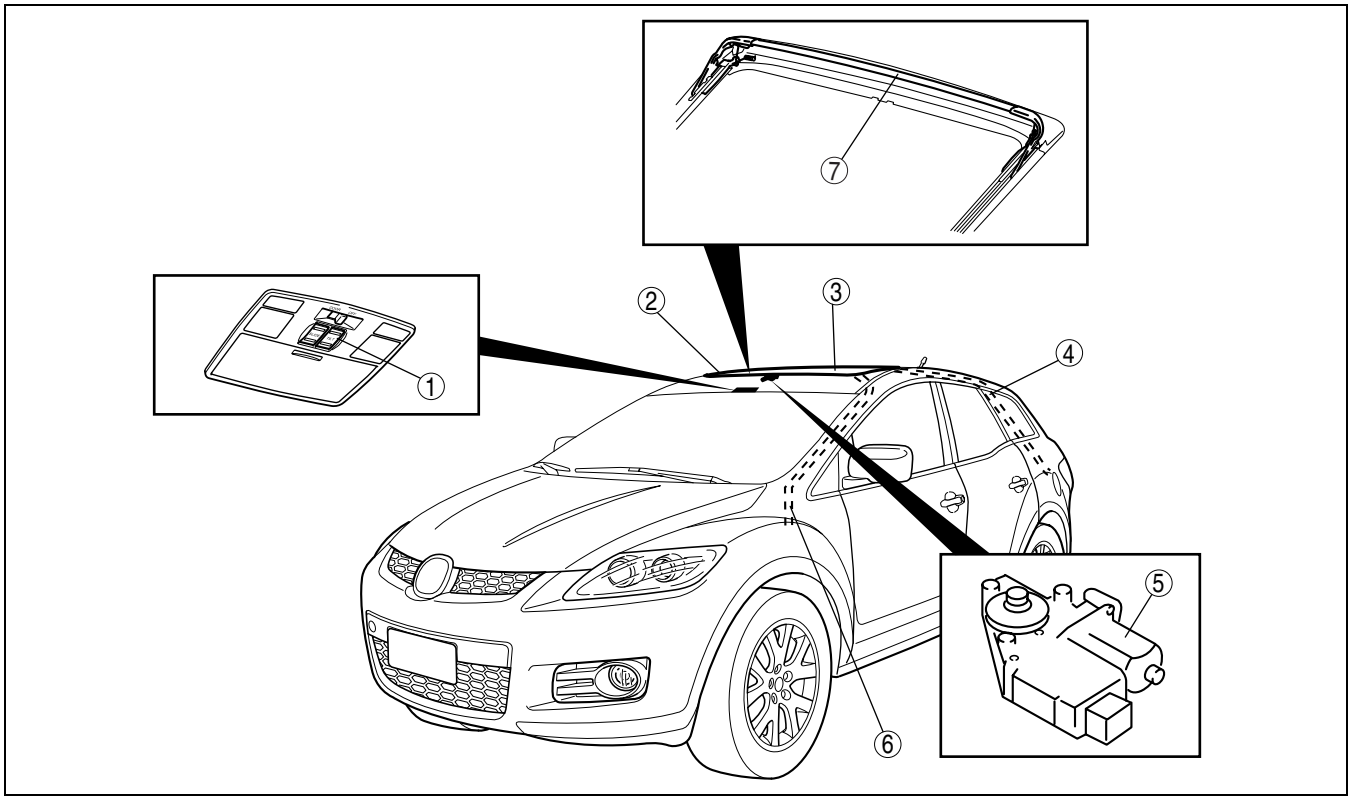
## SUNROOF LOCATION INDEX

id091500800100

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| | |
|---|---|
| 1 | Sunroof switch<br>(See 09-15-2 SUNROOF SWITCH REMOVAL/INSTALLATION.)<br>(See 09-15-2 SUNROOF SWITCH INSPECTION.) |
| 2 | Sunroof unit<br>(See 09-15-4 SUNROOF UNIT REMOVAL/INSTALLATION.)<br>(See 09-15-5 SUNROOF UNIT DISASSEMBLY/ASSEMBLY.) |
| 3 | Glass panel<br>(See 09-15-3 GLASS PANEL REMOVAL/INSTALLATION.)<br>(See 09-15-3 GLASS PANEL ADJUSTMENT.) |

| | |
|---|---|
| 4 | Rear drain hose<br>(See 09-15-11 REAR DRAIN HOSE REMOVAL.)<br>(See 09-15-12 REAR DRAIN HOSE INSTALLATION.) |
| 5 | Sunroof motor<br>(See 09-15-8 SUNROOF MOTOR REMOVAL/INSTALLATION.)<br>(See 09-15-8 SUNROOF MOTOR INSPECTION.) |
| 6 | Front drain hose<br>(See 09-15-9 FRONT DRAIN HOSE REMOVAL)<br>(See 09-15-10 FRONT DRAIN HOSE INSTALLATION) |
| 7 | Deflector<br>(See 09-15-2 DEFLECTOR REMOVAL/INSTALLATION) |

## SUNROOF SWITCH REMOVAL/INSTALLATION

id091500800200

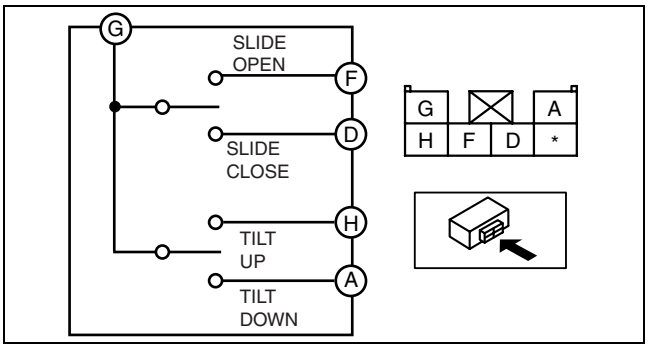
**Note**
- The sunroof switch is together with the front map light.

1. Disconnect the negative battery cable.
2. Remove the map light from the headliner. (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
3. Install in the reverse order of removal.

## SUNROOF SWITCH INSPECTION

id091500800300

1. Inspect for continuity between the sunroof switch terminals using an ohmmeter.
   - If not as specified, replace the sunroof switch.

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○—○ : Continuity

| Switch position | Terminal | | | | |
|---|---|---|---|---|---|
| | A | D | F | H | G |
| Slide open | | | ○ | | ○ |
| Slide closed | | ○ | | | ○ |
| Tilt up | | | | ○ | ○ |
| Tilt down | ○ | | | | ○ |
| Off | | | | | |

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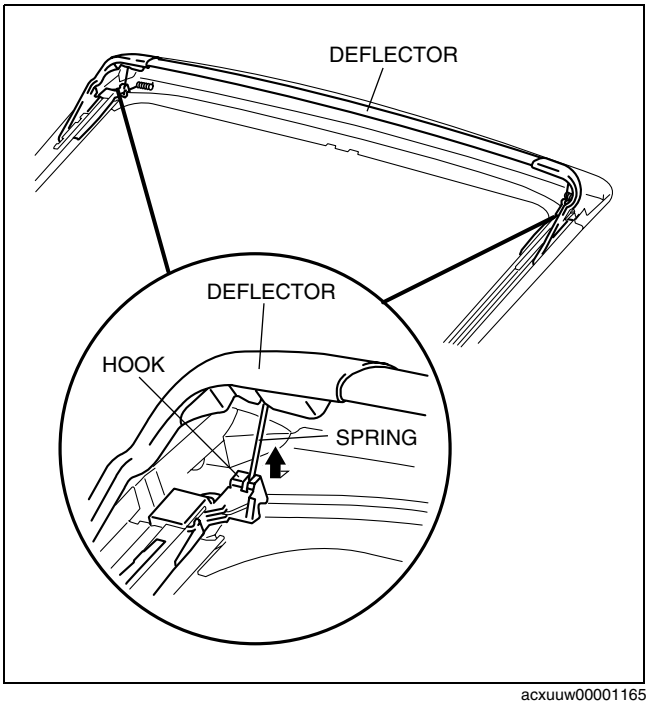
## DEFLECTOR REMOVAL/INSTALLATION

id091500800400

1. Fully open the glass panel.
2. Press the spring in the direction shown by the arrow and remove it from the hook.
3. Remove the deflector.
4. Install in the reverse order of removal.

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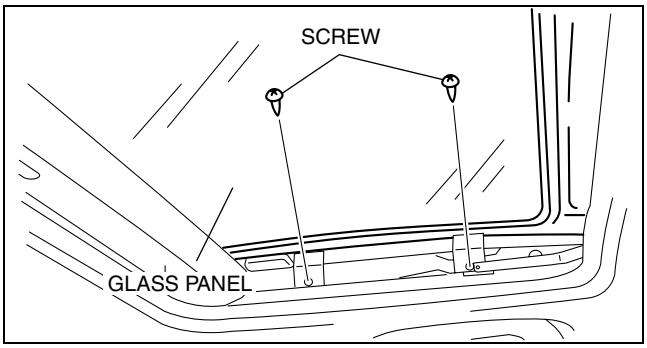
## GLASS PANEL REMOVAL/INSTALLATION

id091500800500

1. Fully close the glass panel.
2. Fully open the sunshade.
3. Remove the screws, and then remove the glass panel.

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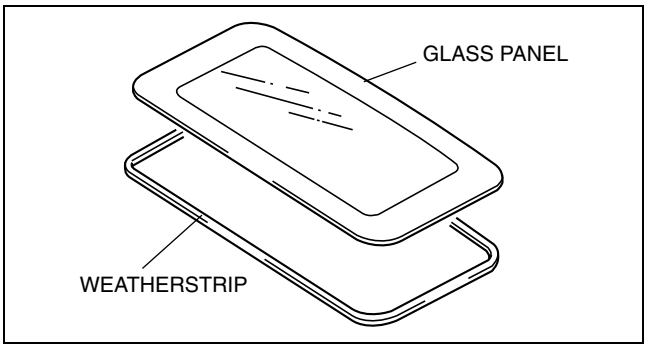
4. Peel the weatherstrip off the glass panel.
5. Install in the reverse order of removal.
6. Adjust the glass panel. (See 09-15-3 GLASS PANEL ADJUSTMENT.)

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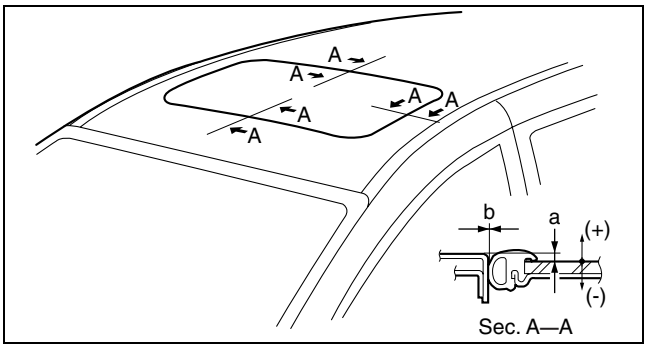
## GLASS PANEL ADJUSTMENT

id091500800600

1. Fully close the glass panel.
2. Measure the gap and height between the glass panel and body.
3. If not as specified, loosen the glass panel installation screws and reposition the glass panel.

**Clearance**
**a: 0— 2.7 mm {0— 0.106 in}**
**b: 0 mm {0 in}**

4. Tighten the installation screws.
5. Insert a credit card between the weatherstrip and the body of the vehicle. Verify that the sunroof is shut tightly (there is resistance when the credit card is moved).
   - If the sunroof is not shut tightly, readjust by performing Steps 3 and 4.

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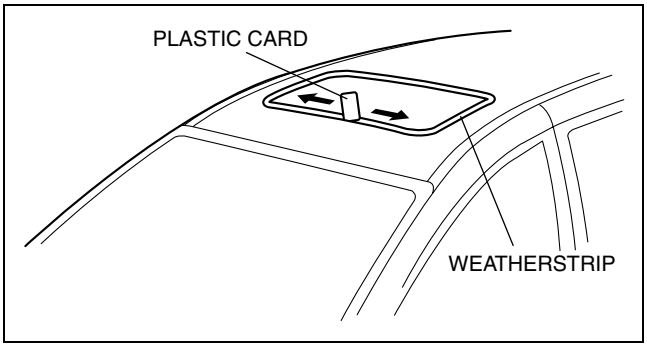


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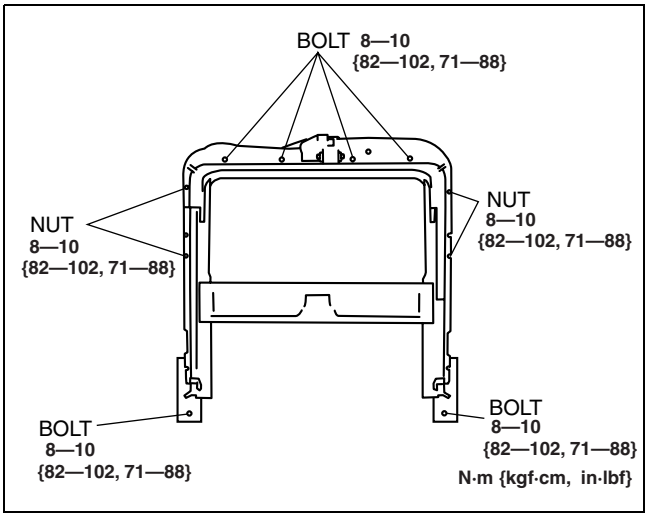
## SUNROOF UNIT REMOVAL/INSTALLATION

id091500800700

**Caution**
- **If the sunshade is forced close while the sunroof is open, the sunshade could be damaged.**

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17)Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
   (18)Glass panel (See 09-15-3 GLASS PANEL REMOVAL/INSTALLATION.)
3. Disconnect the front and rear drain hose from the sunroof frame.
4. Remove the bolts.
5. Remove the nuts, and then remove the sunroof unit.
6. Install in the reverse order of removal.
7. Adjust the glass panel. (See 09-15-3 GLASS PANEL ADJUSTMENT.)

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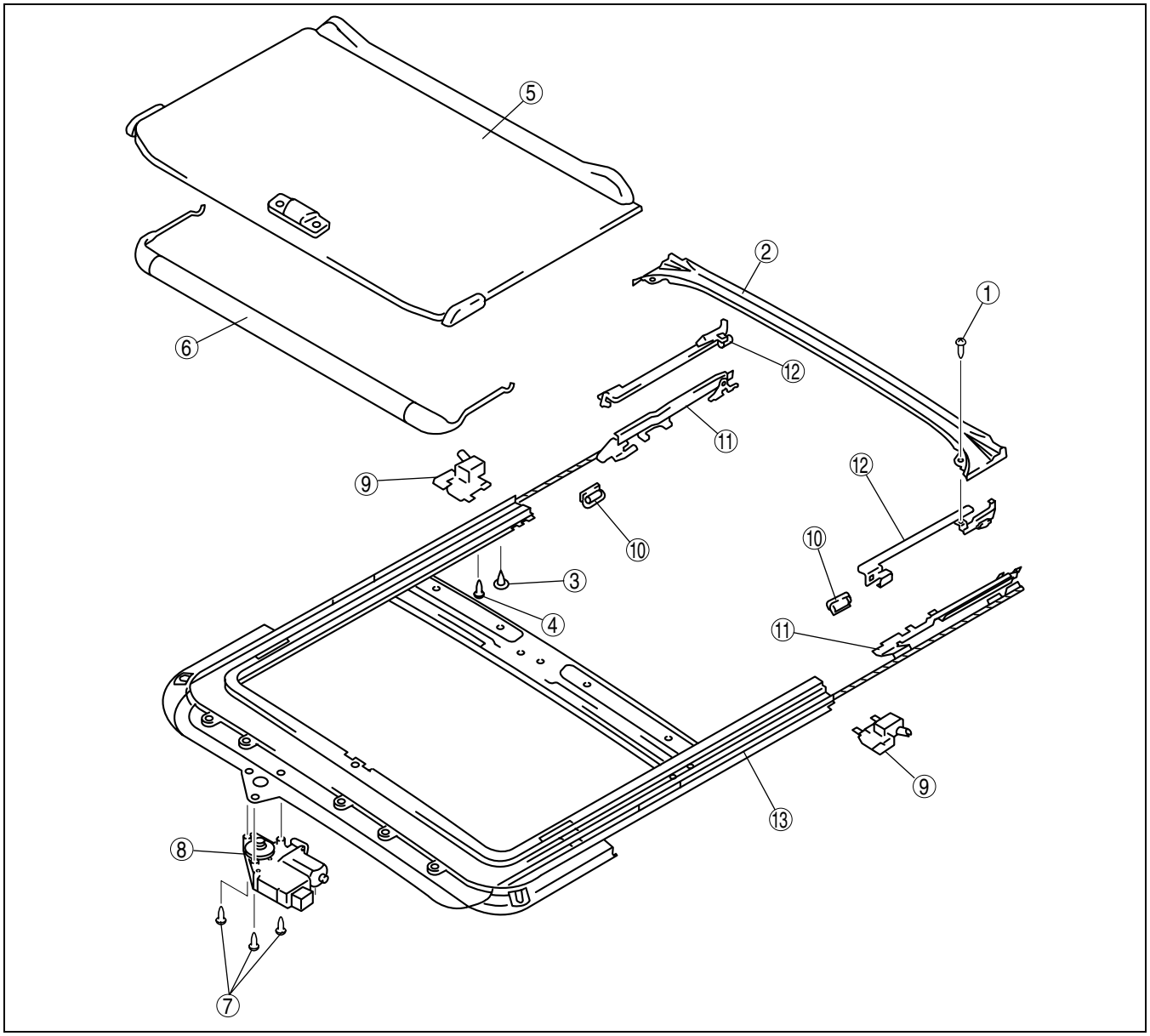
## SUNROOF UNIT DISASSEMBLY/ASSEMBLY

id091500800800

**Note**

- If the guide or sunroof motor is removed, the glass panel will not be positioned properly after the re-installation. To ensure proper positioning of the glass panel, place alignment marks on the guide pin and frame before removing the guide or sunroof motor.

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

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| | |
|---|---|
| 1 | Screw A |
| 2 | Drip rail |
| 3 | Sunshade stopper Drip Guide |
| 4 | Screw B |
| 5 | Sunshade |
| 6 | Deflector |
| 7 | Screw C |
| 8 | Sunroof motor<br>(See 09-15-6 Sunroof Motor Assembly Note.) |

| | |
|---|---|
| 9 | Rear drip<br>(See 09-15-6 Rear Drip Assembly Note.) |
| 10 | Guide stopper |
| 11 | Guide<br>(See 09-15-6 Guide Disassembly Note.)<br>(See 09-15-7 Guide Assembly Note.) |
| 12 | Decoration link<br>(See 09-15-7 Decoration Link Assembly Note) |
| 13 | Frame |

**Sunroof Motor Assembly Note**

**Note**
- If the guide or sunroof motor is removed, the sunroof motor initial position setting has to be performed. After installing the sunroof unit, perform the initial position setting using the following procedure.

1. The initialization mode starts after **approx. 13 s** from when the tilt up switch has been pressed and held. The glass stops after it has moved **approx. 30 mm** towards the closed position.

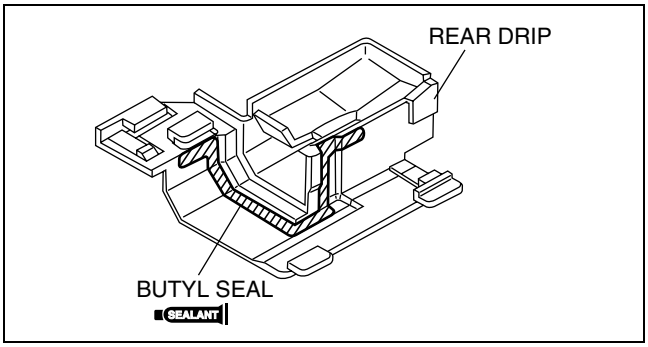
**Note**
- Only the tilt up switch is available during the initialization mode.
- The initialization may finish at the first inching operation depending on the glass position when the motor is installed.
- If the glass position is between the closed and semi-tilt positions when the motor is removed, the glass moves in the tilt up direction (to the full tilt position stored in the motor). However, if the tilt up switch is pressed and held, the initialization mode starts.

2. When the tilt up switch is pressed again, the glass continues to move **approx. 30 mm** and stops.
3. Repeat this procedure several times so that the glass moves to the fully closed, full tilt (normal operation position), and full tilt (mechanical stopper position) positions.
4. After the glass is moved to the full tilt position (mechanical stopper position), it returns to the tilt down direction slightly and the initialization is completed.

**Rear Drip Assembly Note**

**Note**
- If the rear drip is removed, butyl seal must be applied when re-installing.

1. Apply a **6.0— 8.0 mm {0.24— 0.31 in}** wide line of butyl seal to the area shown in the figure.

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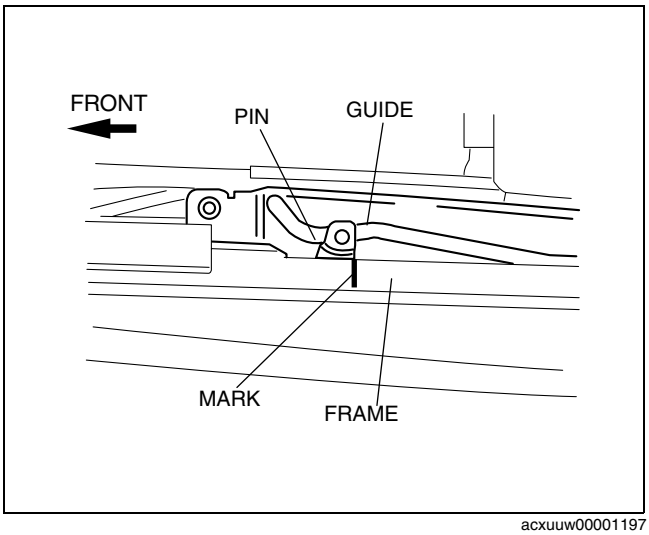
**Guide Disassembly Note**

1. Place an alignment mark on the guide pin and flame.

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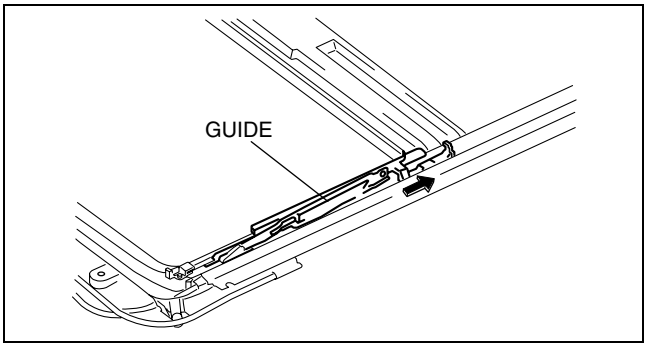
2. Slide the guide to the rear of the sunroof frame, and remove the guide and decoration link as a single unit.

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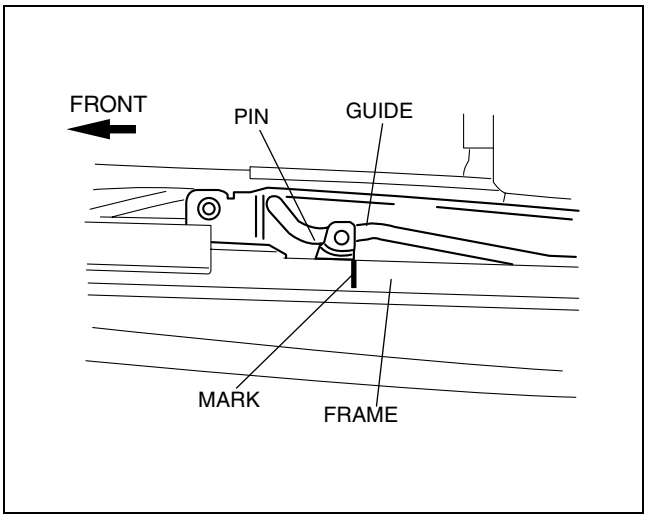
**Guide Assembly Note**

1. Move the pin to the position shown in the figure.

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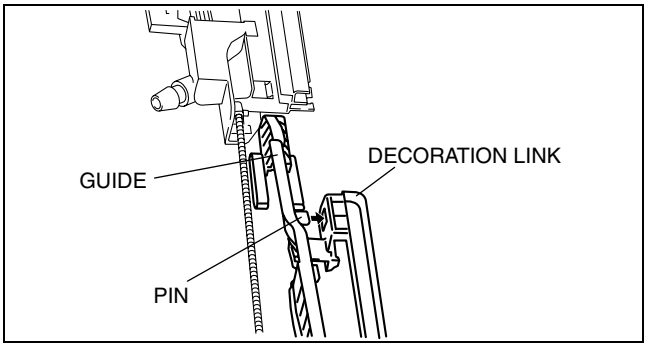
**Decoration Link Assembly Note**

1. Set the guide pin to the decoration link.

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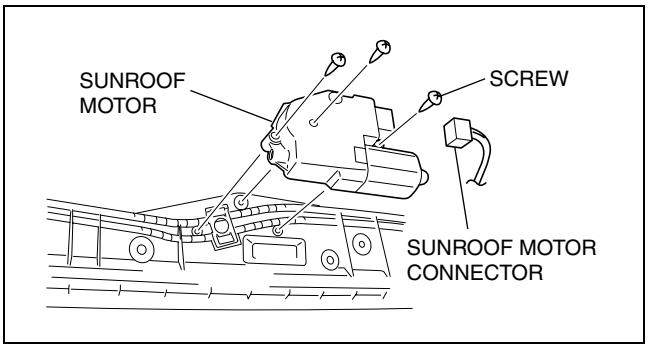
## SUNROOF MOTOR REMOVAL/INSTALLATION

id091500805000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17)Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
3. Disconnect the sunroof motor connector.
4. Remove the screws, and then remove the sunroof motor.
5. Install in the reverse order of removal.

**Note**

- If the glass panel or the sunroof motor is moved with the sunroof motor removed, initial position setting of the sunroof motor will be required. Perform initial position setting referring to the Sunr of Motor Assembly Note. (See 09-15-5 SUNROOF UNIT DISASSEMBLY/ASSEMBLY.)

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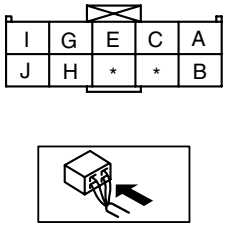
## SUNROOF MOTOR INSPECTION

id091500801100

1. Measure the voltage at each terminal (other than terminal G).
   - If not as specified, inspect the parts listed under “Inspection item” and the related wiring harnesses.
2. Disconnect the negative battery cable.
3. Verify that continuity at terminal G is as indicated in the Terminal Voltage Table (Reference).
4. If the parts and wiring harnesses are normal but the system still does not work properly, replace the sunroof relay.

**Terminal voltage table (Reference)**

SUNROOF MOTOR WIRING HARNESS-SIDE CONNECTOR

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| Terminal | Signal | Connected to | Test condition | Voltage (V)/ Continuity | Inspection item |
|---|---|---|---|---|---|
| A | Slide open | Sunroof switch | Sunroof is fully opening. | B+ | Sunroof switch |
| | | | Other | 1.0 or less | |

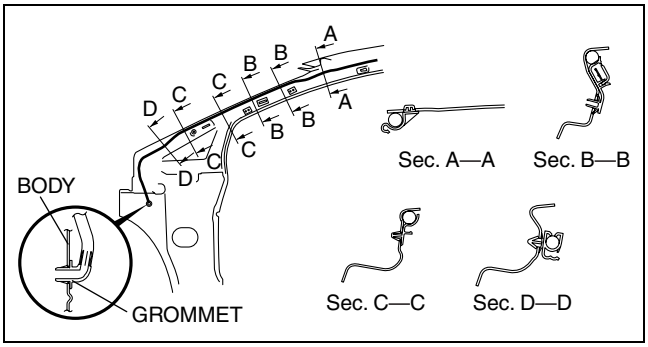
| Terminal | Signal | Connected to | Test condition | Voltage (V)/ Continuity | Inspection item |
|---|---|---|---|---|---|
| B | Slide close/tilt down | Sunroof switch | Sunroof is closing/tilting down. | B+ | Sunroof switch |
| | | | Other | 1.0 or less | |
| C | Tilt up | Sunroof switch | Sunroof is tilting up. | B+ | Sunroof switch |
| | | | Other | 1.0 or less | |
| E | IG2 | A/C fuse | Turn the ignition switch to the ON position. | B+ | A/C fuse |
| | | | Other | 1.0 or less | |
| G | GND | GND | Under any condition: Check for continuity to ground. | Continuity | GND |
| H | Communication | BCM | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | — | BCM |
| I | Vehicle speed | Instrument cluster | pulse signal | — | Instrument cluster |
| J | Power supply | A/C PWR fuse | Under any condition | B+ | A/C PWR fuse |

**FRONT DRAIN HOSE REMOVAL**

id091500801300

1. Disconnect the negative battery cable.
2. Partially peel back the seaming welt.
3. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17)Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
   (18)Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (19)Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (20)Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (21)Dashboard under cover
   (22)Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (23)Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (24)Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (25)Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (26)Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (27)Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
   (28)Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
   (29)Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (30)Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
   (31)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (32)Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (33)Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (34)Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (35)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (36)Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)

4. Disconnect the front drain hose from the sunroof frame.
5. Remove the front drain hose from the clips.
6. Pull the front drain hose into the room side.
7. Remove the front drain hose.

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**FRONT DRAIN HOSE INSTALLATION**

id091500801400

**Caution**

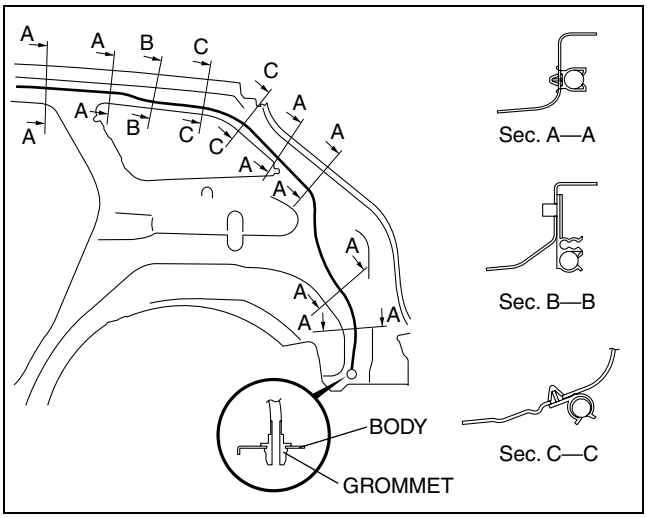
- **If the front drain hose is pinched or bent anywhere, the water in the hose may not discharge and enter the inside of the vehicle. During and after installation of the trims and the headliner, always make sure there is no interference with the front drain hose. Fix any problem if found.**

1. Apply soapy water to the front drain hose inserting area.
2. Insert one end (the wider end) of the front drain hose into the sunroof frame.
3. Install the front drain hose to the clips, parallel to the pillar and free of slack.
4. Insert the front drain hose joint into the hinge pillar inner hole.
5. Install the following parts:
   (1) Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)
   (2) Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (3) Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (4) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (5) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (6) Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (7) Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
   (8) Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (9) Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
   (10) Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
   (11) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (12) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (13) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (14) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (15) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (16) Dashboard under cover
   (17) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (18) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (19) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (20) Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
   (21) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (22) Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (23) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (24) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (25) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (26) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (27) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (28) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (29) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (30) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (31) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (32) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (33) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (34) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (35) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (36) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
6. Install the seaming welt.

**REAR DRAIN HOSE REMOVAL**

id091500801500

1. Disconnect the negative battery cable.
2. Partially peel back the seaming welt.
3. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17)Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
4. Disconnect the rear drain hose from the sunroof frame.
5. Remove the rear drain hose from the clips.
6. Pull the rear drain hose into the room side.
7. Remove the rear drain hose.

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## REAR DRAIN HOSE INSTALLATION

id091500801600

**Caution**

- **If the rear drain hose is pinched or bent anywhere, the water in the hose may not discharge and enter the inside of the vehicle. During and after installation of the trims and the headliner, always make sure there is no interference with the rear drain hose. Fix any problem if found.**

1. Apply soapy water to the rear drain hose inserting area.
2. Insert one end (the wider side) of the rear drain hose into the sunroof frame.
3. Install the rear drain hose to the clips parallel to the pillar and free of slack.
4. Insert the rear drain hose joint into the rear pillar inner hole.
5. Install the following parts:
   (1) Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
   (2) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (3) Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (4) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (5) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (6) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (7) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (8) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (11) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (12) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (13) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (14) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (15) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (16) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (17) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
6. Install the seaming welt.

# 09-16 EXTERIOR TRIM

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## EXTERIOR TRIM LOCATION INDEX

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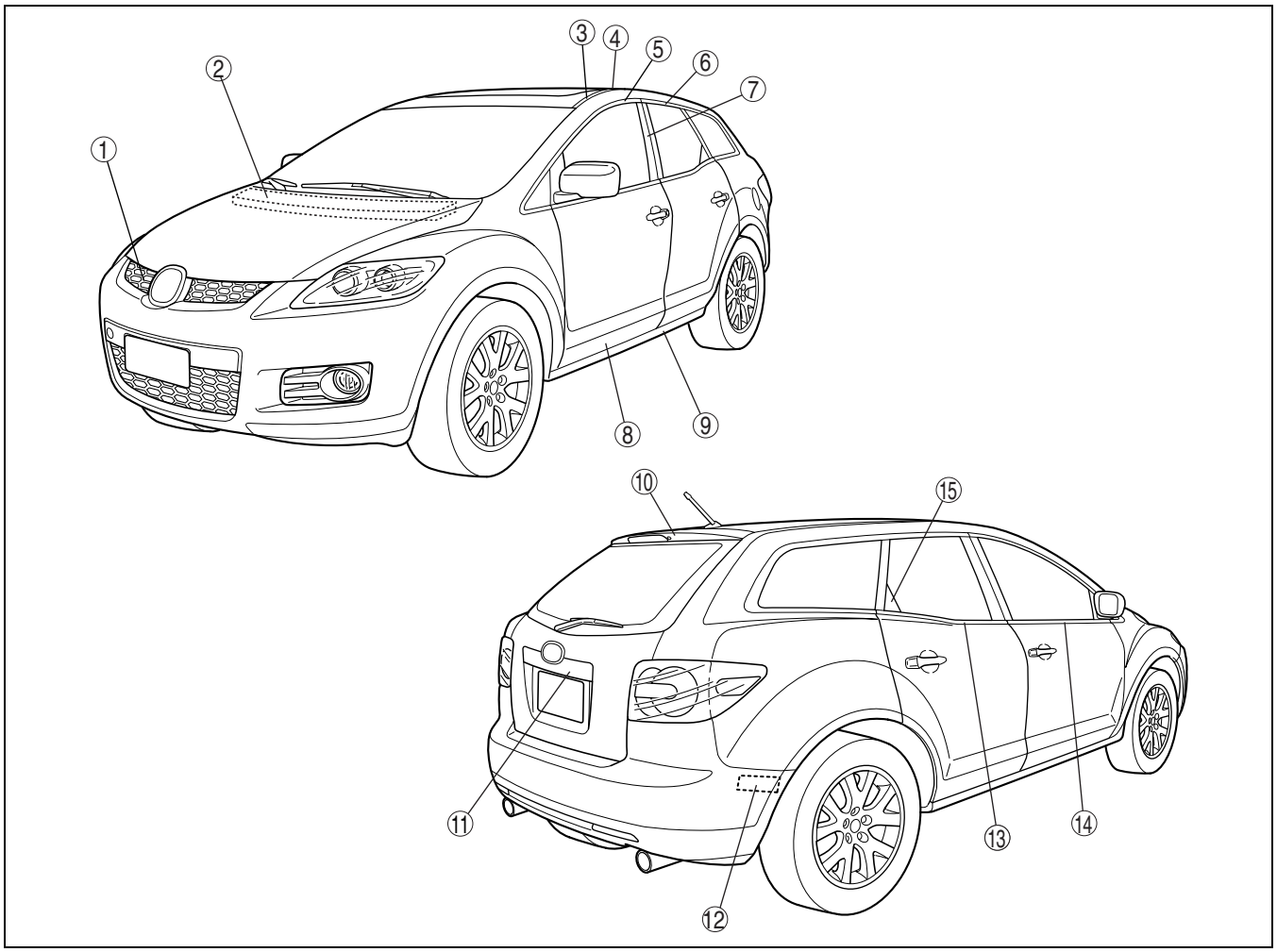


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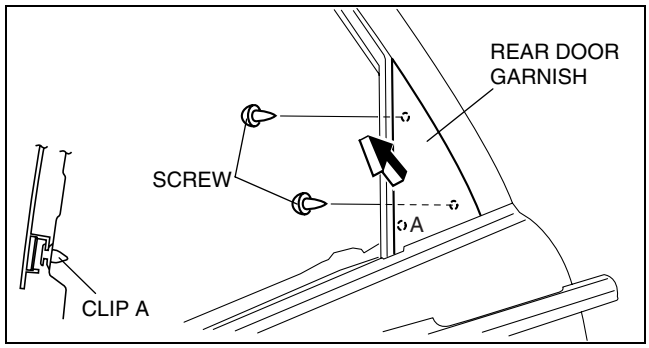
| | |
|---|---|
| 1 | Radiator grille<br>(See 09-16-11 RADIATOR GRILLE REMOVAL/ INSTALLATION.) |
| 2 | Cowl grille<br>(See 09-16-11 COWL GRILLE REMOVAL/ INSTALLATION.) |
| 3 | Roof molding<br>(See 09-16-10 ROOF MOLDING REMOVAL.)<br>(See 09-16-10 ROOF MOLDING INSTALLATION.) |
| 4 | Roof carrier bracket<br>(See 09-16-12 ROOF CARRIER BRACKET REMOVAL/INSTALLATION.) |
| 5 | Front sash molding<br>(See 09-16-4 FRONT SASH MOLDING REMOVAL.)<br>(See 09-16-4 FRONT SASH MOLDING INSTALLATION.) |
| 6 | Rear sash molding<br>(See 09-16-5 REAR SASH MOLDING REMOVAL.)<br>(See 09-16-6 REAR SASH MOLDING INSTALLATION.) |
| 7 | Door sash film<br>(See 09-16-7 DOOR SASH FILM REMOVAL.)<br>(See 09-16-7 DOOR SASH FILM INSTALLATION.) |
| 8 | Side garnish<br>(See 09-16-13 SIDE GARNISH REMOVAL.)<br>(See 09-16-14 SIDE GARNISH INSTALLATION.) |
| 9 | Side step molding<br>(See 09-16-14 SIDE STEP MOLDING REMOVAL.)<br>(See 09-16-15 SIDE STEP MOLDING INSTALLATION.) |
| 10 | Rear spoiler<br>(See 09-16-12 REAR SPOILER REMOVAL/ INSTALLATION.) |
| 11 | Rear finisher<br>(See 09-16-3 REAR FINISHER REMOVAL/ INSTALLATION.) |
| 12 | Extractor chamber<br>(See 09-16-12 EXTRACTOR CHAMBER REMOVAL/INSTALLATION.) |
| 13 | Rear beltline molding<br>(See 09-16-9 REAR BELTLINE MOLDING REMOVAL/INSTALLATION.) |
| 14 | Front beltline molding<br>(See 09-16-9 FRONT BELTLINE MOLDING REMOVAL/INSTALLATION.) |
| 15 | Rear door garnish<br>(See 09-16-3 REAR DOOR GARNISH REMOVAL/ INSTALLATION.) |

## REAR DOOR GARNISH REMOVAL/INSTALLATION

id091600804200

1. Remove the sail garnish. (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
2. Remove the rear beltline molding. (See 09-16-9 REAR BELTLINE MOLDING REMOVAL/INSTALLATION.)
3. Remove the screws.
4. Pull the rear door garnish in the direction shown by the arrow and remove clip A from the rear door garnish.
5. Remove the rear door garnish.
6. Remove clips A from the body, then install it to the rear door garnish.
7. Install in the reverse order of removal.

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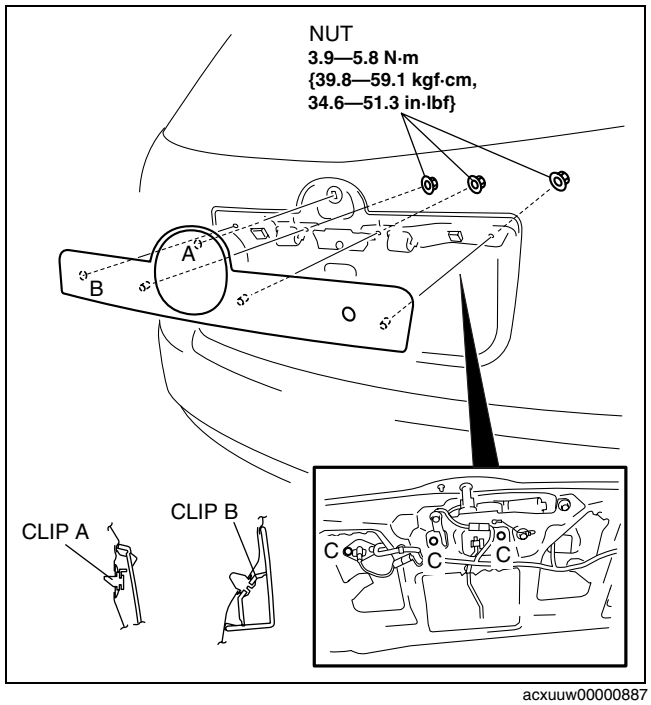
## REAR FINISHER REMOVAL/INSTALLATION

id091600800200

1. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION)
2. Remove the liftgate side trim. (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION)
3. Remove the liftgate lower trim (See 09-17-26 LIFTGATE LOWER TRIM REMOVAL/INSTALLATION.)
4. Remove the nuts at section C indicated in the figure.
5. Pull the rear finisher outward, then disengage clip A, B from the body.
6. Install in the reverse order of removal.

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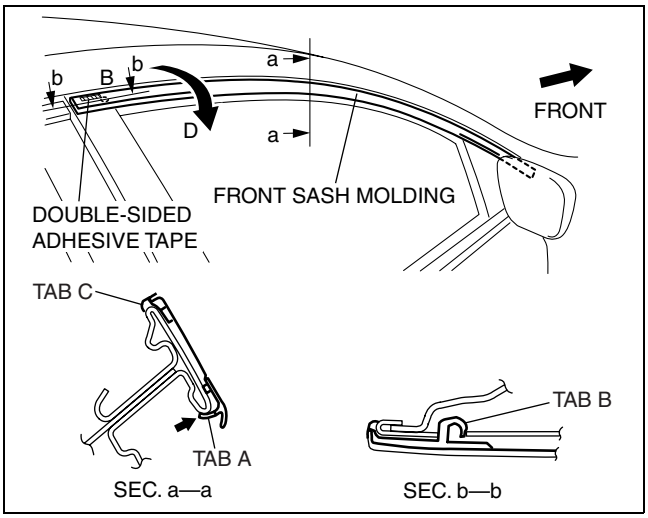
## FRONT SASH MOLDING REMOVAL

id091600805000

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

1. Fully open the front door glass.
2. Partially peel back the glass run channel.
3. Press tab A in the direction of the arrow and remove it.
4. While cutting the double-sided adhesive tape using a screwdriver or a razor, separate the front sash molding from the body.
5. Rotate the front sash molding at the pivot of tab B in the direction of arrow D and remove it.
6. Remove the tab C.
7. Remove the front sash molding.

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## FRONT SASH MOLDING INSTALLATION

id091600807000

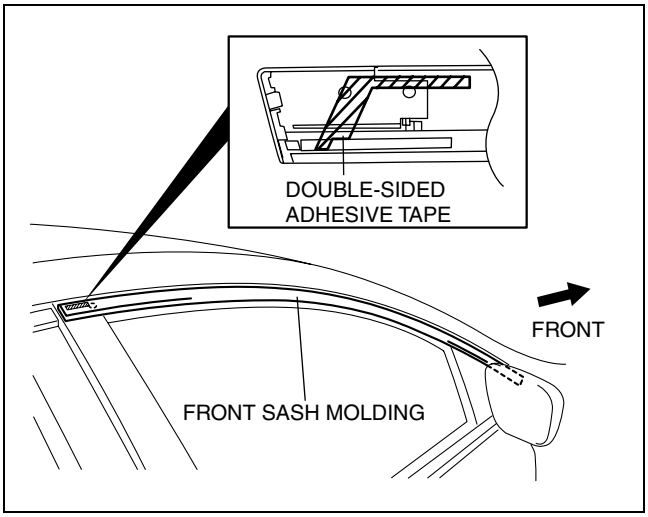
**Note**
- Double-sided adhesive tape has already been attached to the new front sash molding.

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

1. When installing a new front sash molding, follow the procedure below:
   (1) Remove the adhesive remaining on the body using razor.
   (2) Remove any grease or dirt from the adhesion surface of the body.
2. When reusing the front sash molding, follow the procedure below:
   (1) Remove the adhesive remaining on the front sash molding and the body using a razor.
   (2) Remove any grease or dirt from the adhesion surface of the front sash molding and the body.
   (3) Apply primer to the bonding area of the front sash molding.
   (4) Attach double-sided adhesive tape to the front sash molding as shown.

**Note**
- As for the double-sided adhesive tape, use beta tape 5078 (1 mm {0.04 in} thickness) or equivalent.

3. Peel off the backing of the double-sided adhesive tape.

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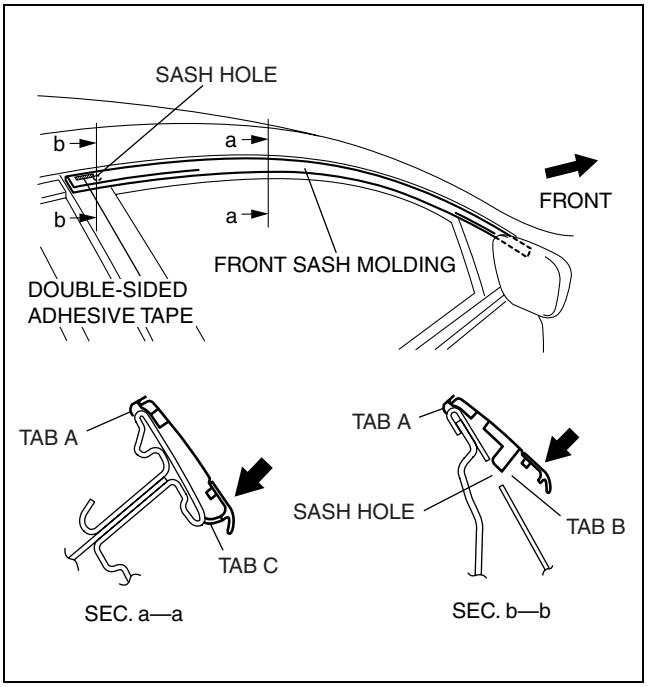
4. Hook tab A to the body in the position where tabs B align with the sash holes.
5. Press the front sash molding in the direction of the arrow and install tabs B to the body.

**Caution**
- **Do not press the front sash molding in any place other than the rubber areas.**

6. Press the front sash molding from the vehicle rear in the direction shown in the arrow and install tab C.

**Note**
- After installing the front sash molding, verify that tabs A and B are connected properly to the body.

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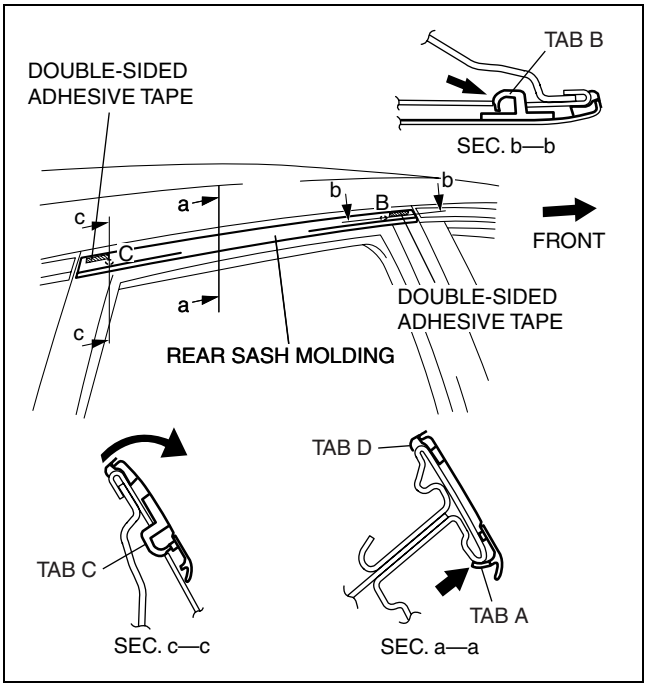
**REAR SASH MOLDING REMOVAL**

id091600805100

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

1. Fully open the front door glass.
2. Partially peel back the glass run channel.
3. Press tab A in the direction of the arrow and remove it.
4. While cutting the double-sided adhesive tape using a screwdriver or a razor, separate the rear sash molding from the body.
5. Press tab B in the direction of the arrow and remove it.
6. Remove the tab C.
7. Rotate the rear sash molding in the direction of the arrow and remove tab C.
8. Remove the rear sash molding.

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## REAR SASH MOLDING INSTALLATION

id091600807100

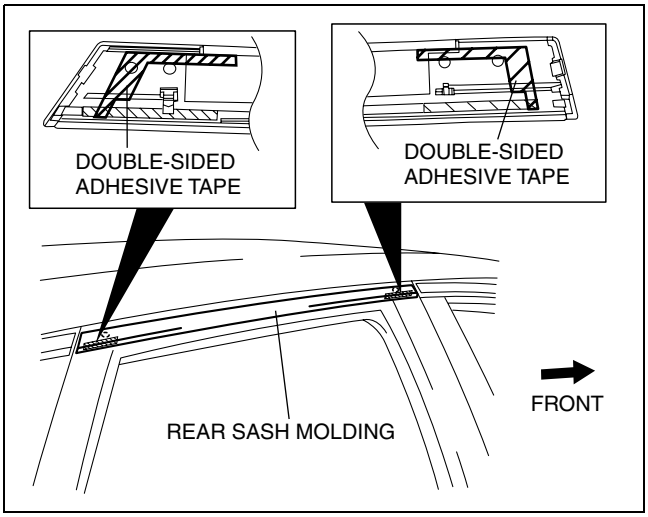
**Note**
- Double-sided adhesive tape has already been attached to the new rear sash molding.

**Warning**
- **Using a razor with bare hands can cause injury. Always wear gloves when using a razor.**

1. When installing a new rear sash molding, follow the procedure below:
   (1) Remove the adhesive remaining on the body using razor.
   (2) Remove any grease or dirt from the adhesion surface of the body.
2. When reusing the rear sash molding, follow the procedure below:
   (1) Remove the adhesive remaining on the rear sash molding and the body using a razor.
   (2) Remove any grease or dirt from the adhesion surface of the rear sash molding and the body.
   (3) Apply primer to the bonding area of the rear sash molding.
   (4) Attach double-sided adhesive tape to the rear sash molding as shown.

**Note**
- As for the double-sided adhesive tape, use beta tape 5078 (1 mm {0.04 in} thickness) or equivalent.

3. Peel off the backing of the double-sided adhesive tape.

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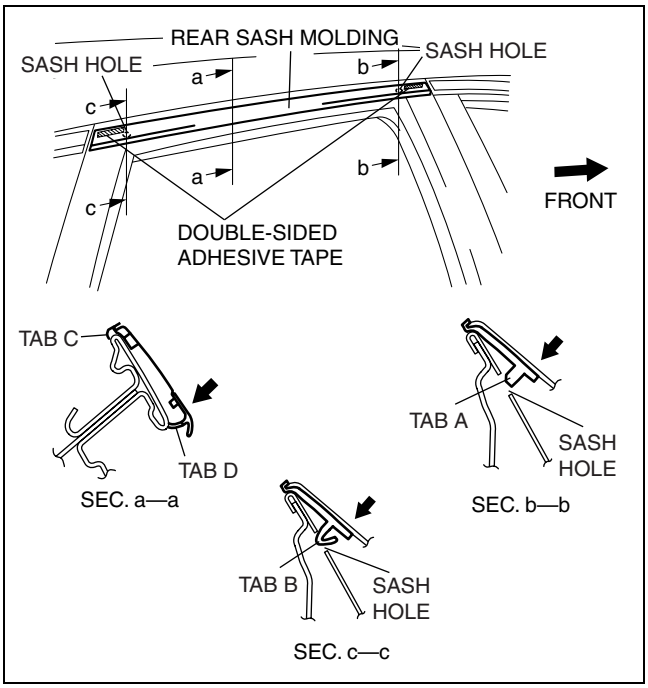
4. Hook tab C to the body in the position where tabs A and B align with the sash holes.
5. Press the rear sash molding in the direction of the arrow and install tabs A and B to the body.

**Caution**
- **Do not press the rear sash molding in any place other than the rubber areas.**

6. Press the rear sash molding from the vehicle front in the direction of the arrow and install tab D.

**Note**
- After installing the front sash molding, verify that tabs C and D are connected properly to the body.

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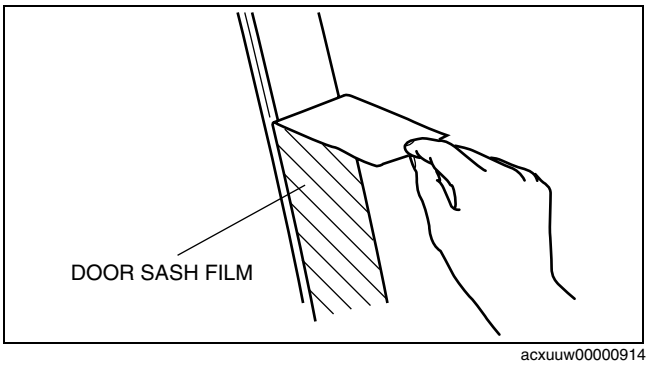
## DOOR SASH FILM REMOVAL

id091600805200

1. Partially peel back the glass run channel.
2. Partially peel back the door weatherstrip.
3. Remove the following parts:
   (1) Inner garnish (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
   (2) Front door trim (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
   (3) Rear door trim (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
   (4) Front beltline molding (See 09-16-9 FRONT BELTLINE MOLDING REMOVAL/INSTALLATION.)
   (5) Rear beltline molding (See 09-16-9 REAR BELTLINE MOLDING REMOVAL/INSTALLATION.)
   (6) Front sash molding (See 09-16-4 FRONT SASH MOLDING REMOVAL.)
   (7) Rear sash molding (See 09-16-5 REAR SASH MOLDING REMOVAL.)
   (8) Sail garnish (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
   (9) Rear door garnish (See 09-16-3 REAR DOOR GARNISH REMOVAL/INSTALLATION.)
4. Peel off the rear sash film by pulling it outward from one end.

**Note**
- Slowly remove the door sash film since it may tear easily.

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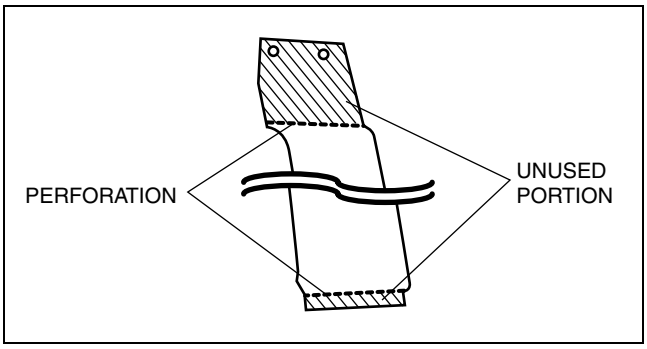
## DOOR SASH FILM INSTALLATION

id091600805300

1. Remove any grease or dirt from the affixing surface of the door.
2. Cut away the unused portion along the dotted lines.

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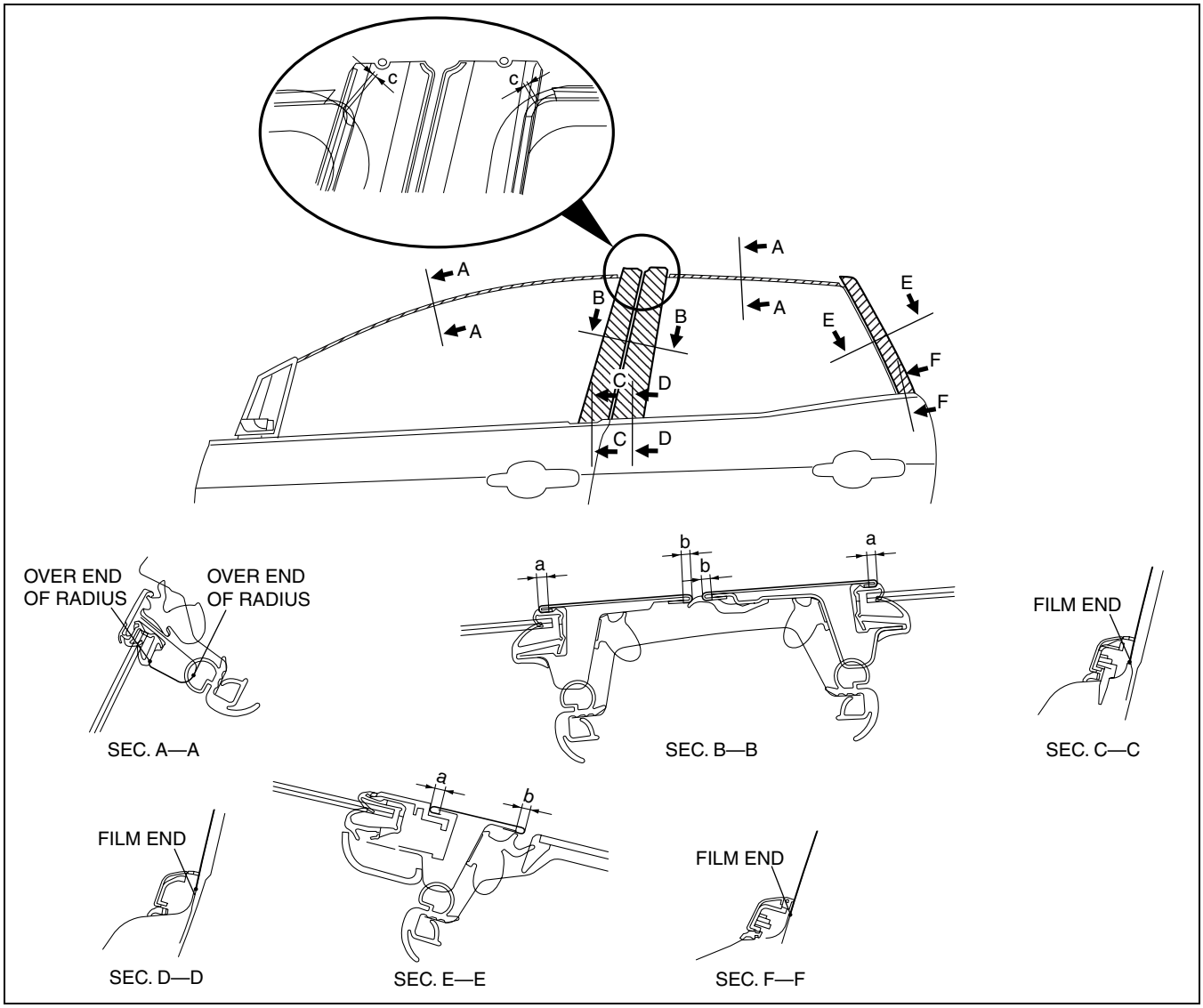
3. Peel off the backing paper and attach the door sash film onto the door as shown in the figure.

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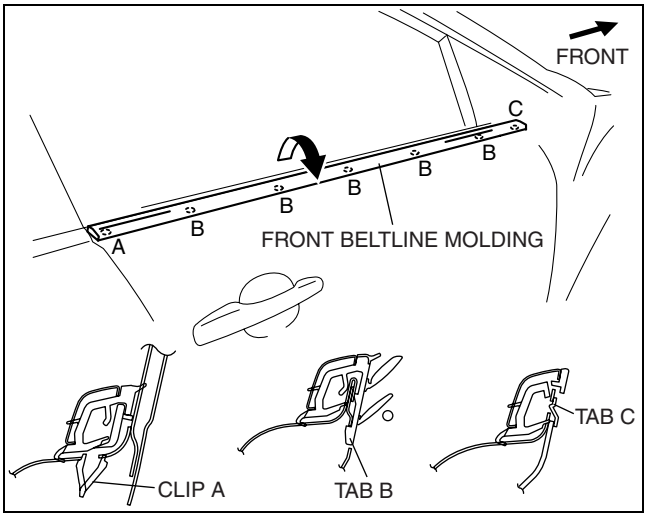
**Standard clearance**
**a: 3.0 mm or more {0.12 in or more}**
**b: 3.0— 5.0 mm {0.12— 0.19 in}**
**c: 2.5 mm or more {0.10 in or more}**

4. Peel off the transparent protective film on the door sash film.
5. Install the following parts:
   (1) Rear door garnish (See 09-16-3 REAR DOOR GARNISH REMOVAL/INSTALLATION.)
   (2) Sail garnish (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
   (3) Rear sash molding (See 09-16-6 REAR SASH MOLDING INSTALLATION.)
   (4) Front sash molding (See 09-16-4 FRONT SASH MOLDING INSTALLATION.)
   (5) Rear beltline molding (See 09-16-9 REAR BELTLINE MOLDING REMOVAL/INSTALLATION.)
   (6) Front beltline molding (See 09-16-9 FRONT BELTLINE MOLDING REMOVAL/INSTALLATION.)
   (7) Rear door trim (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
   (8) Front door trim (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
   (9) Inner garnish (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)

## FRONT BELTLINE MOLDING REMOVAL/INSTALLATION

id091600804800

1. Fully open the front door glass.
2. Disconnect the negative battery cable.
3. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
4. Remove the flont door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
5. Remove the power outer mirror. (See 09-12-34 POWER OUTER MIRROR SWITCH REMOVAL/INSTALLATION.)
6. Remove clip A using a protective tape-wrapped flathead screwdriver.
7. Lift (partially peeling back) the front beltline molding in the direction of the arrow and then remove tabs B.
8. Remove the tab C.
9. Install in the reverse order of removal.

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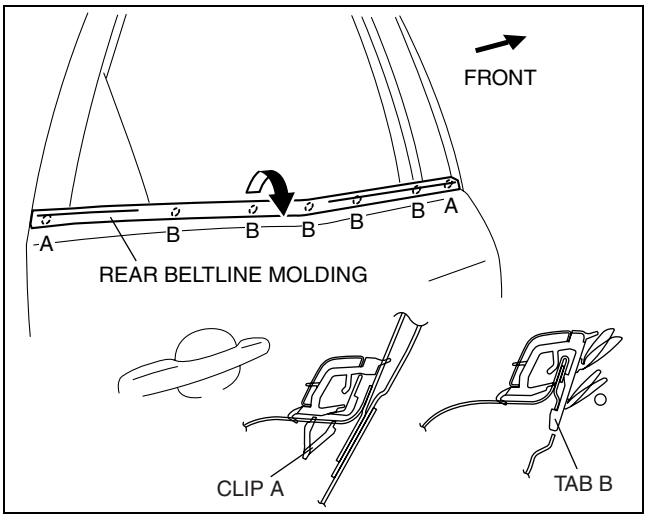
## REAR BELTLINE MOLDING REMOVAL/INSTALLATION

id091600804700

1. Fully lower the rear door glass.
2. Remove clip A using a protective tape-wrapped flathead screwdriver.
3. Lift (partially peeling back) the rear beltline molding in the direction of the arrow and then remove tabs B.
4. Install in the reverse order of removal.

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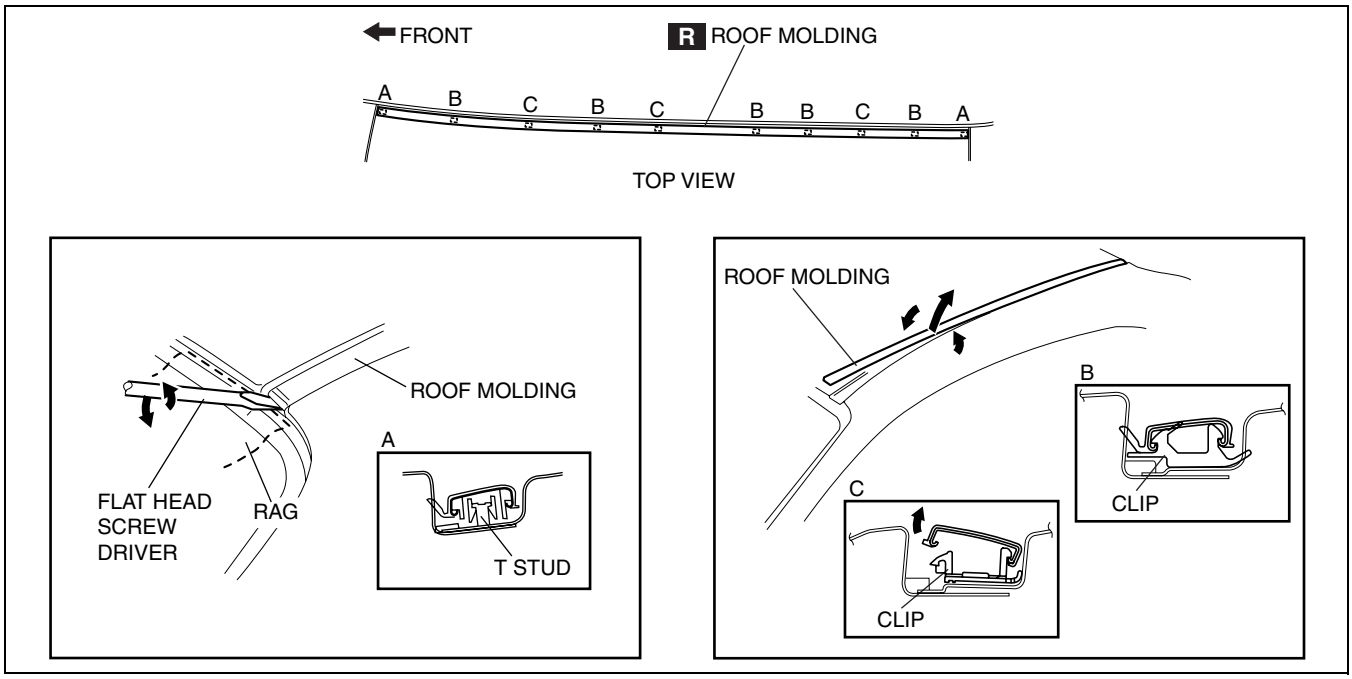
## ROOF MOLDING REMOVAL

id091600800700

1. Detach the T-stud which secure sections A of roof molding, using a screwdriver or equivalent tool.
2. While pulling the roof molding up, detach it from the clips at section B, C, and then remove the roof molding.

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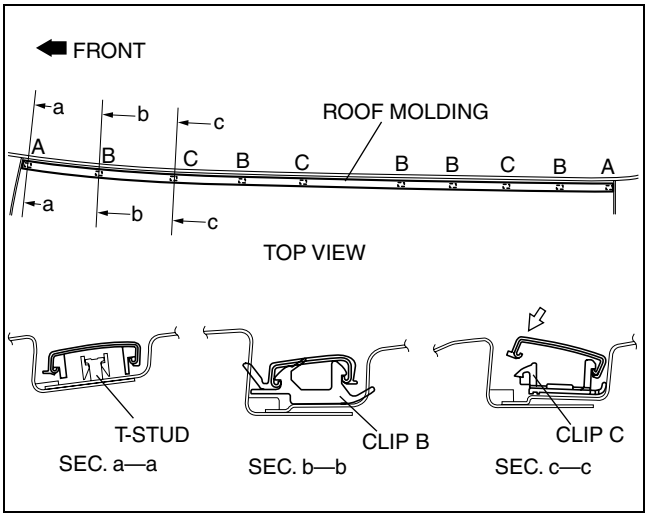
## ROOF MOLDING INSTALLATION

id091600800800

1. Attach the roof molding to the T-stud at the front portion of section A.
2. Hook the roof molding to clips B, C and press it in to attach.
3. Attach the roof molding to the T-stud at the rear portion of section A.

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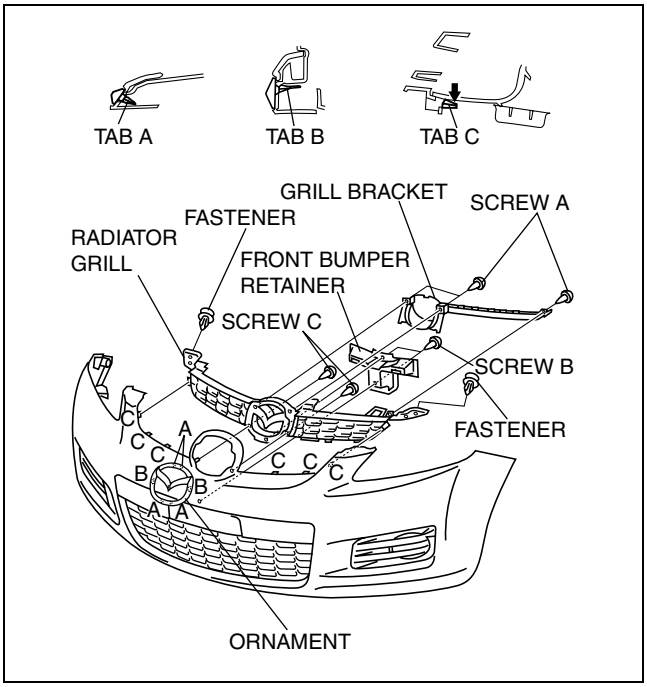
## RADIATOR GRILLE REMOVAL/INSTALLATION

id091600800900

1. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
2. Remove the intercooler duct.
3. Remove the fasteners.
4. Remove the screws A.
5. Remove the grill bracket.
6. Remove the screws B
7. Remove the front bumper retainer.
8. Remove the tabs A and B.
9. Remove the ornament.
10. Remove the screws C.
11. Remove the tabs C
12. Remove the radiator grill.
13. Press tabs C in the direction of the arrow, pull the radiator grille inward, and remove it from the front bumper.
14. Install in the reverse order of removal.

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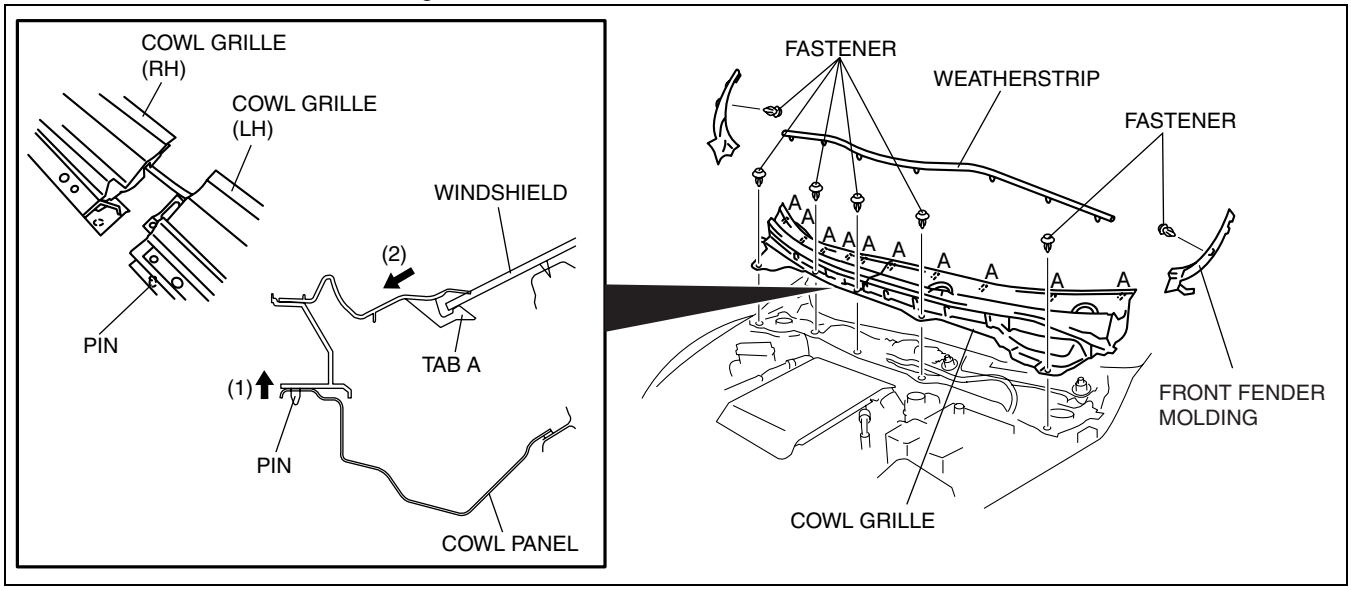
## COWL GRILLE REMOVAL/INSTALLATION

id091600801000

1. Remove the windshield wiper arm and blade. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the front fender molding.

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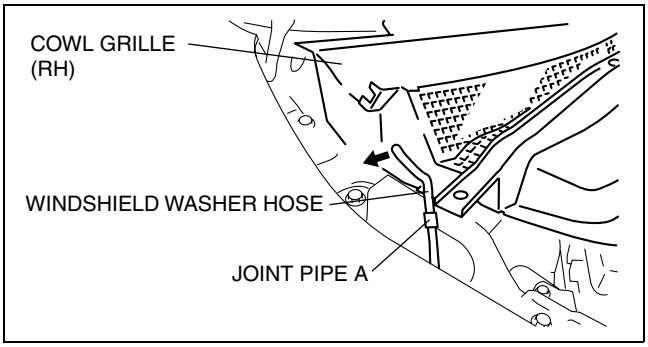
3. Remove the weatherstrip.
4. Remove the fastener.
5. Pull the cowl grille in the direction of arrow (1) so that it is free from the pins, pull tabs A in the direction of arrow (2), and then remove the front window glass.

6. Remove the windshield washer hose.
7. Remove the cowl grille.
8. Install in the reverse order of removal.

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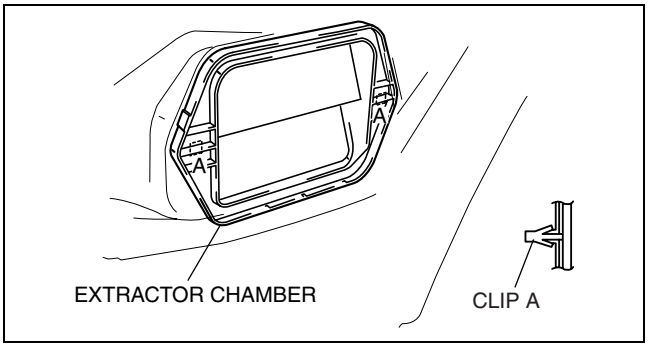
**EXTRACTOR CHAMBER REMOVAL/INSTALLATION**

id091600801500

1. Remove the rear combination light. (See 09-18-11 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)
2. Remove the rear bumper. (See 09-10-4 REAR BUMPER REMOVAL/INSTALLATION.)
3. Remove clip A using a fastener remover and then remove the extractor chamber from the vehicle.
4. Install in the reverse order of removal.

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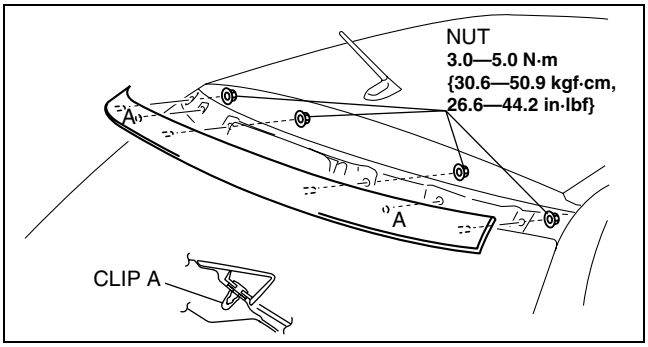
**REAR SPOILER REMOVAL/INSTALLATION**

id091600801600

1. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
2. Remove the nuts.
3. Detach the clips and remove the rear spoiler.
4. Install in the reverse order of removal.

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**ROOF CARRIER BRACKET REMOVAL/INSTALLATION**

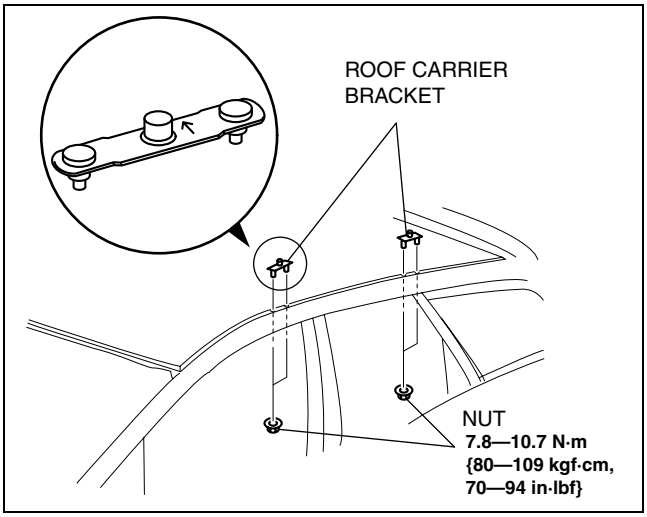
id091600801700

1. Disconnect the negative battery cable.
2. Partially peel back the seaming welt.
3. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)

(15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
(16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
(17)Headliner (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)

4. Remove the nuts.
5. Remove the roof carrier bracket.
6. Install in the reverse order of removal.

**Note**
- Install the roof carrier bracket so that the arrow on it faces inward.

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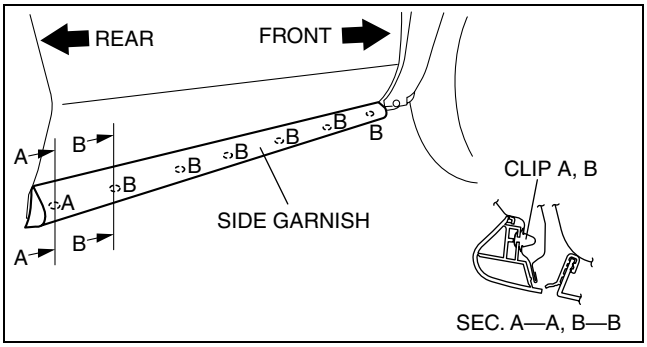
## SIDE GARNISH REMOVAL

id091600804600

### Front

1. Pull the side garnish and remove clips A from the vehicle body.
2. Slide the side garnish to the vehicle rear and remove clips B from the side garnish.
3. Remove the side garnish.
4. Remove clips B from the body, then install it to the side garnish.

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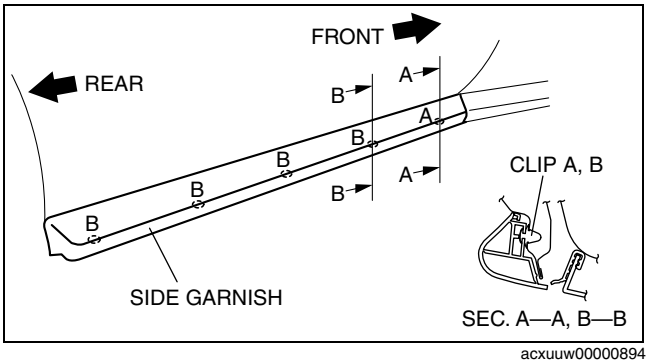
### Rear

1. Pull the side garnish and remove clips A from the vehicle body
2. Slide the side garnish to the vehicle front and remove clips B from the side garnish.
3. Remove the side garnish.
4. Remove clips B from the body, then install it to the side garnish.

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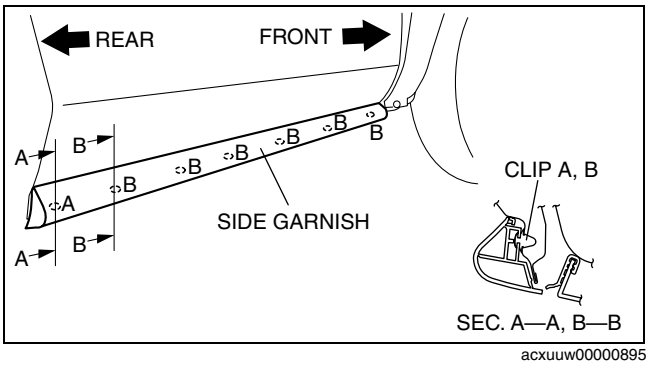
## SIDE GARNISH INSTALLATION

id091600804500

### Front

1. Install clips A and then B to the vehicle from the front side.

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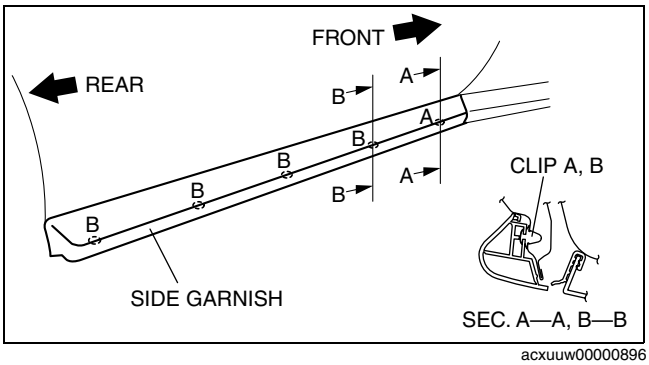
### Rear

1. Install clips A and then B to the vehicle from the rear side.

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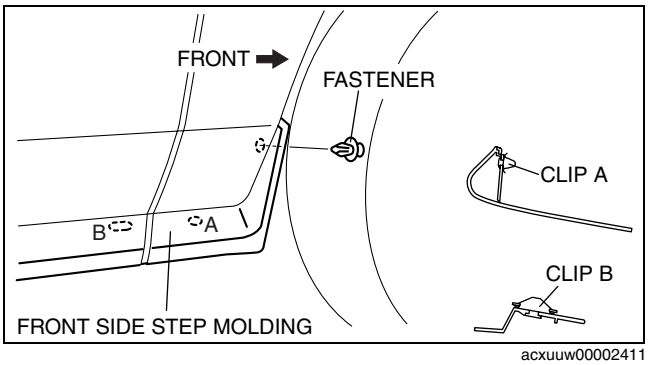
## SIDE STEP MOLDING REMOVAL

id091600804400

1. Remove the fastener.
2. Pull the side step molding front and remove clip A from the vehicle body.
3. Slide the side step molding front to the vehicle front and remove clip B from the side step molding front.
4. Remove the side step molding front.
5. Remove clips B from the body, then install it to the side step molding front.

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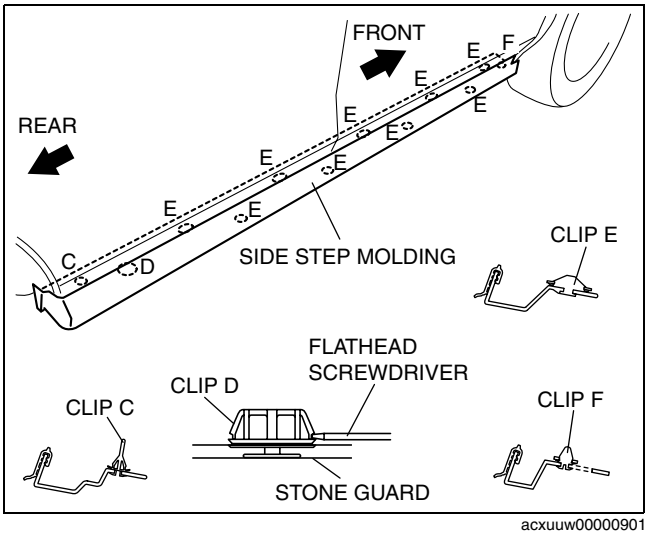
6. Pull the side step molding front and remove clip C and F from the vehicle body.
7. Detach clip D using a tape-wrapped flathead screwdriver as shown in the figure.
8. Slide the side step molding to the vehicle rear and remove clips E from the side step molding.
9. Remove the side step molding.
10. Remove clips E from the body, then install it to the side step molding.

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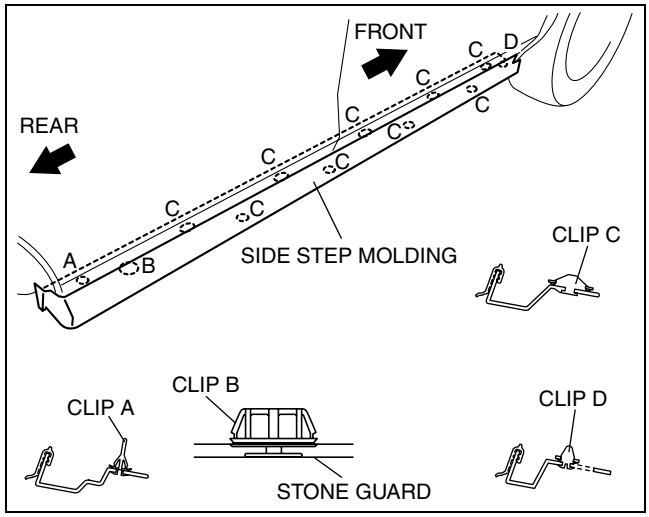
## SIDE STEP MOLDING INSTALLATION

id091600804300

1. Install the clip A, D
2. Install the clip B.
3. Install the clips C.
4. Install the side step molding.

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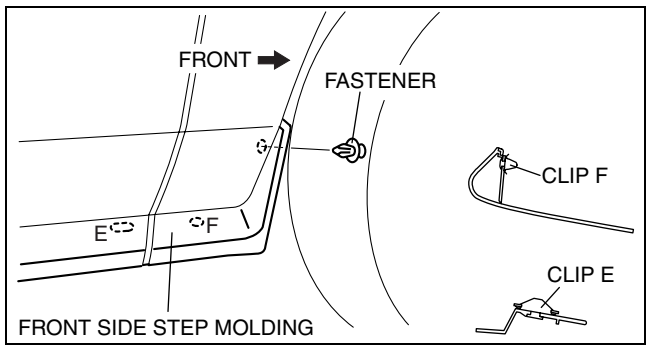
5. Install the fastener.
6. Install the clip F.
7. Install the clip E.
8. Install the fornt side step molding.

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# 09-17 INTERIOR TRIM

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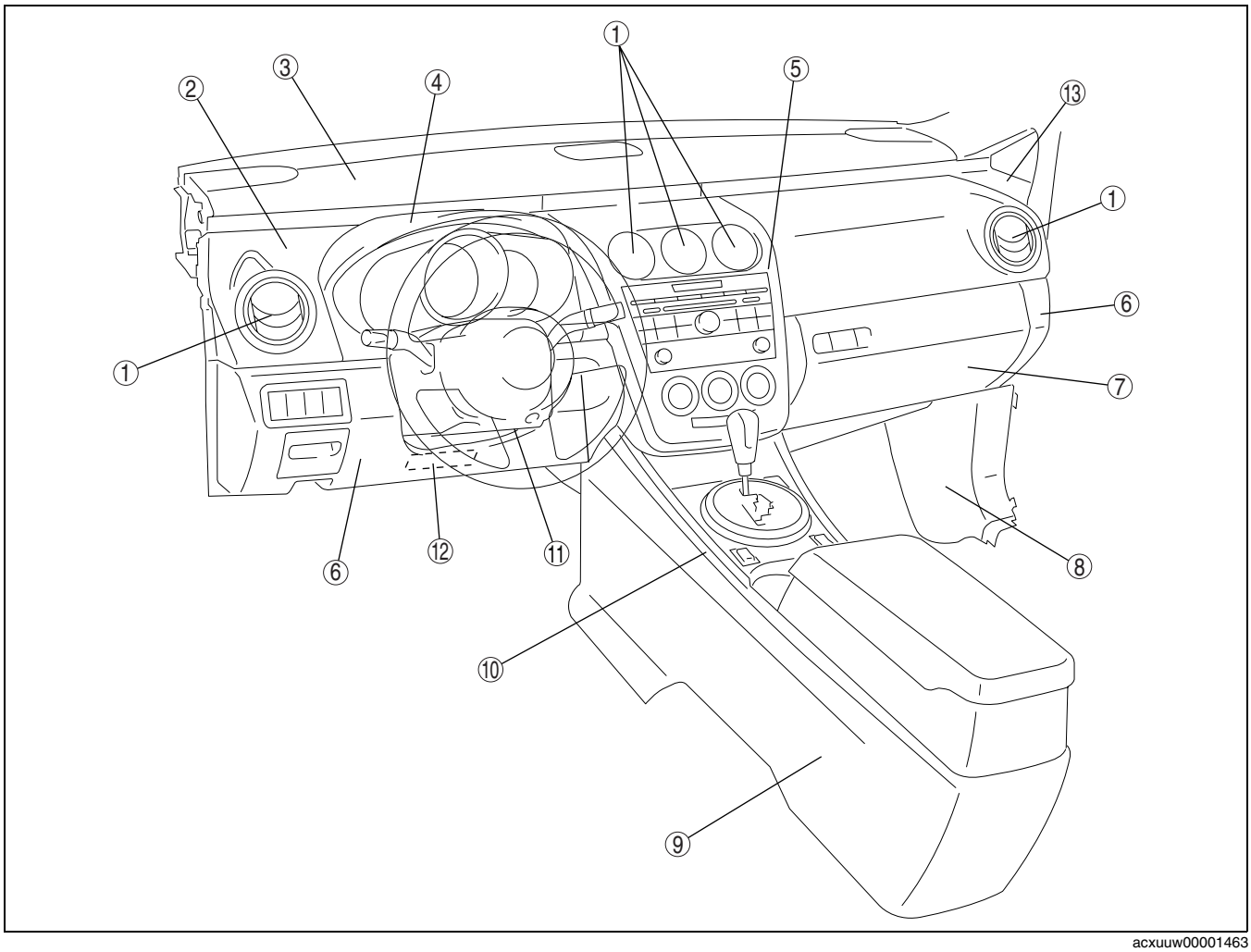


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| | |
|---|---|
| 1 | Ventilator grill<br>(See 09-17-10 VENTILATOR GRILLE REMOVAL/ INSTALLATION.) |
| 2 | Dashboard garnish<br>(See 09-17-18 DASHBOARD GARNISH REMOVAL/ INSTALLATION.) |
| 3 | Dashboard<br>(See 09-17-4 DASHBOARD REMOVAL/ INSTALLATION.)<br>(See 09-17-6 DASHBOARD DISASSEMBLY/ ASSEMBLY.) |
| 4 | Meter hood<br>(See 09-17-10 METER HOOD REMOVAL/ INSTALLATION.) |
| 5 | Center panel<br>(See 09-17-8 CENTER PANEL REMOVAL/ INSTALLATION.) |
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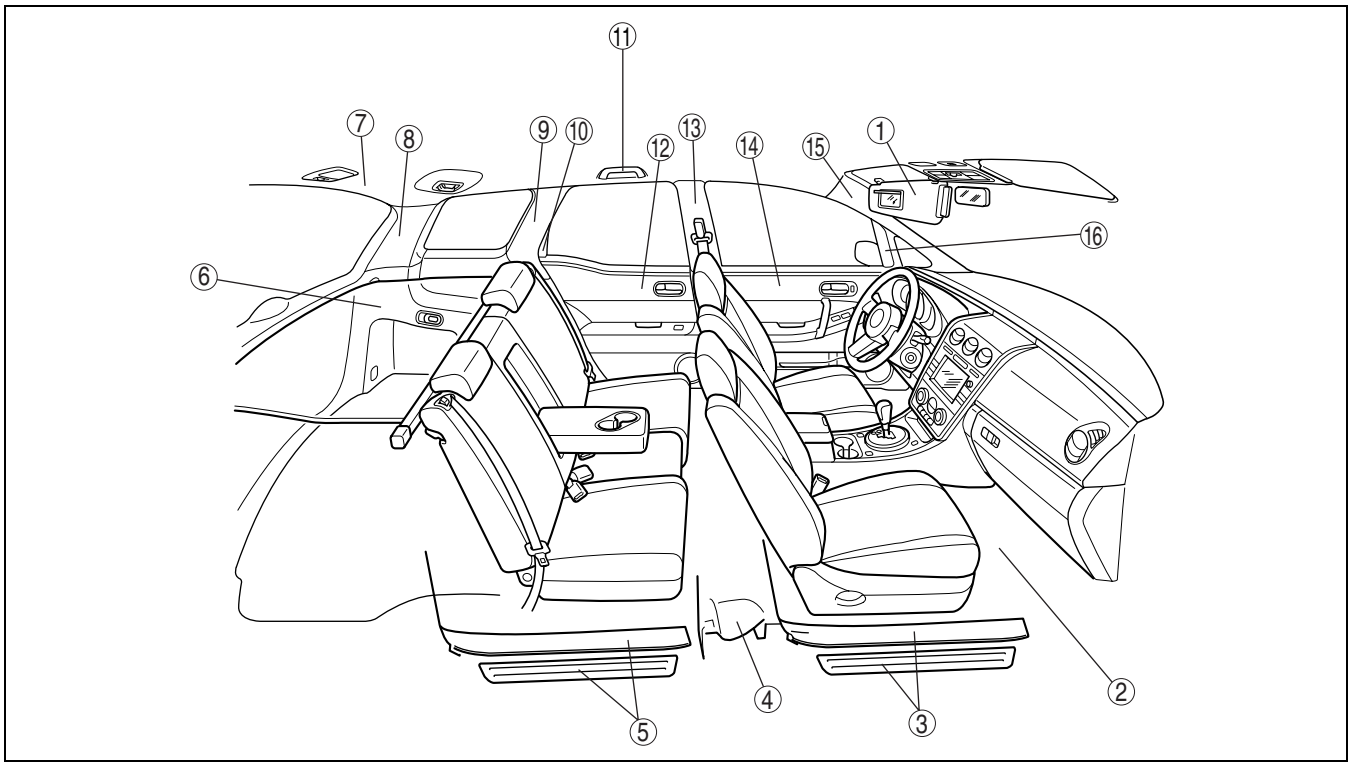
| 7 | Glove compartment<br>(See 09-17-8 GLOVE COMPARTMENT REMOVAL/ INSTALLATION.) |
| 8 | Front side trim<br>(See 09-17-18 FRONT SIDE TRIM REMOVAL/ INSTALLATION.) |
| 9 | Console<br>(See 09-17-13 CONSOLE REMOVAL/ INSTALLATION.)<br>(See 09-17-14 CONSOLE DISASSEMBLY/ ASSEMBLY.) |
| 10 | Console panel<br>(See 09-17-15 CONSOLE PANEL REMOVAL/ INSTALLATION.) |
| 11 | Column cover<br>(See 09-17-8 COLUMN COVER REMOVAL/ INSTALLATION.) |
| 12 | Knee bolster<br>(See 09-17-12 KNEE BOLSTER REMOVAL/ INSTALLATION.) |
| 13 | A-pillar lower trim<br>(See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.) |

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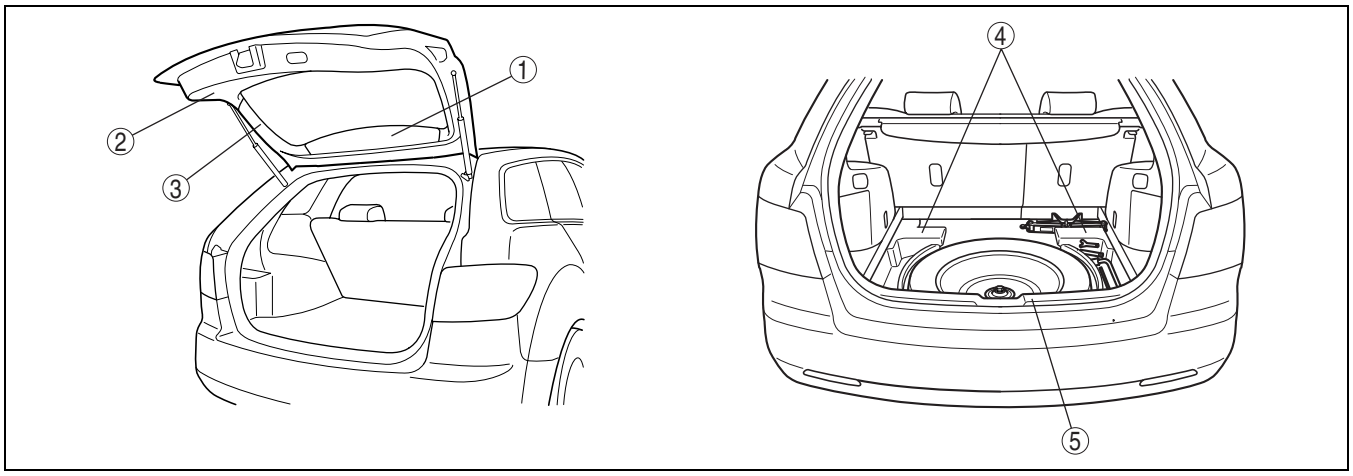
| | |
|---|---|
| 1 | Sunvisor<br>(See 09-17-26 SUNVISOR REMOVAL/ INSTALLATION.) |
| 2 | Floor covering<br>(See 09-17-28 FLOOR COVERING REMOVAL/ INSTALLATION.) |
| 3 | Front scuff plate<br>(See 09-17-19 FRONT SCUFF PLATE REMOVAL/ INSTALLATION.) |
| 4 | B-pillar lower trim<br>(See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/ INSTALLATION.) |
| 5 | Rear scuff plate<br>(See 09-17-19 REAR SCUFF PLATE REMOVAL/ INSTALLATION.) |
| 6 | Trunk side trim<br>(See 09-17-24 TRUNK SIDE TRIM REMOVAL/ INSTALLATION.) |
| 7 | Headliner<br>(See 09-17-27 HEADLINER REMOVAL/ INSTALLATION.) |
| 8 | D-pillar trim<br>(See 09-17-18 D-PILLAR TRIM REMOVAL/ INSTALLATION.) |
| 9 | C-pillar trim<br>(See 09-17-17 C-PILLAR TRIM REMOVAL/ INSTALLATION.) |

| | |
|---|---|
| 10 | Sail garnish<br>(See 09-17-12 SAIL GARNISH REMOVAL/ INSTALLATION.) |
| 11 | Assist handle<br>(See 09-17-27 ASSIST HANDLE REMOVAL/ INSTALLATION.) |
| 12 | Rear door trim<br>(See 09-17-23 REAR DOOR TRIM REMOVAL/ INSTALLATION.)<br>(See 09-17-23 REAR DOOR TRIM DISASSEMBLY/ ASSEMBLY.) |
| 13 | B-pillar upper trim<br>(See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/ INSTALLATION.) |
| 14 | Front door trim<br>(See 09-17-20 FRONT DOOR TRIM REMOVAL/ INSTALLATION.)<br>(See 09-17-22 FRONT DOOR TRIM DISASSEMBLY/ASSEMBLY.) |
| 15 | A-pillar trim<br>(See 09-17-15 A-PILLAR TRIM REMOVAL/ INSTALLATION.) |
| 16 | Inner garnish<br>(See 09-17-20 INNER GARNISH REMOVAL/ INSTALLATION.) |

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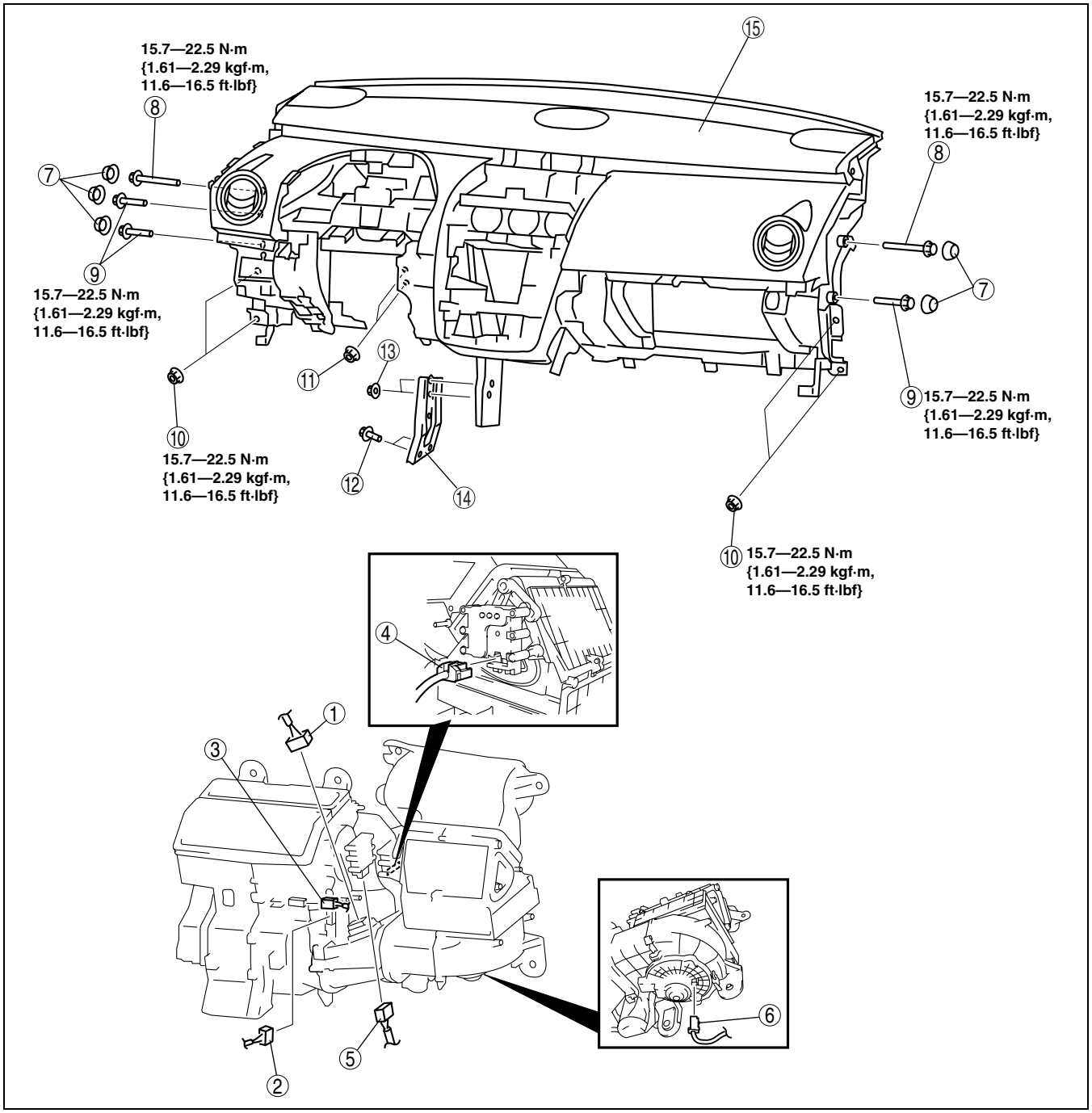
| | |
|---|---|
| 1 | Liftgate upper trim<br>(See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.) |
| 2 | Liftgate lower trim<br>(See 09-17-26 LIFTGATE LOWER TRIM REMOVAL/INSTALLATION.) |
| 3 | Liftgate side trim<br>(See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION.) |
| 4 | Sub trunk box<br>(See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.) |
| 5 | Trunk end trim<br>(See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.) |

**DASHBOARD REMOVAL/INSTALLATION**

id091700800300

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Dashboard under cover
   (6) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10)Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (11)Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
   (12)Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
   (13)Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (14)Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
   (15)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (16)Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (17)Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (18)Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (19)Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (20)A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (21)A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Disconnect the dashboard harness connectors.
4. Remove in the order indicated in the figure.

5. Install in the reverse order of removal.

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| | |
|---|---|
| 1 | Resistor connector (with manual air conditioner system) |
| | Power MOS FET connector (with full-auto air conditioner system) |
| 2 | Air mix actuator connector (with full-auto air conditioner system) |
| 3 | Evaporator temperature sensor connector |
| 4 | Air intake actuator connector |
| 5 | Airflow mode actuator connector (with full-auto air conditioner system)<br>(See 09-17-6 Airflow mode actuator connector Disassembly Note.) |
| 6 | Blower motor connector |

| | |
|---|---|
| 7 | Cap |
| 8 | Bolt A |
| 9 | Bolt B |
| 10 | Nut A |
| 11 | Nut B |
| 12 | Bolt C |
| 13 | Nut C |
| 14 | Dashboard bracket |
| 15 | Dashboard<br>(See 09-17-6 Dashboard Removal Note.) |

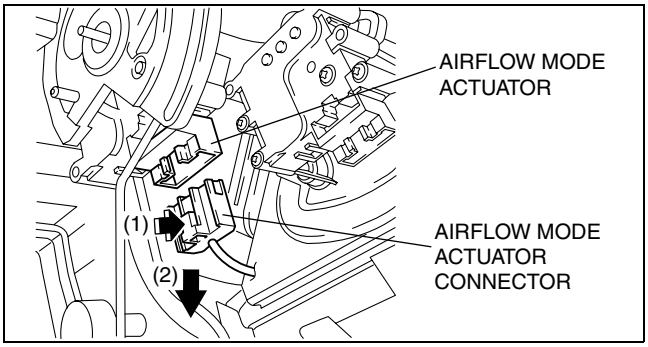
**Dashboard Removal Note**

**Warning**
- **Removing the dashboard without supporting it can be dangerous. the dashboard may fall and injure you. Always perform the following procedure with at least another person.**

1. Take the dashboard out through the opened front driver-side door.

**Airflow mode actuator connector Disassembly Note**

1. Disconnect the connector by pulling it in direction (2) while pressing the tab in direction (1).

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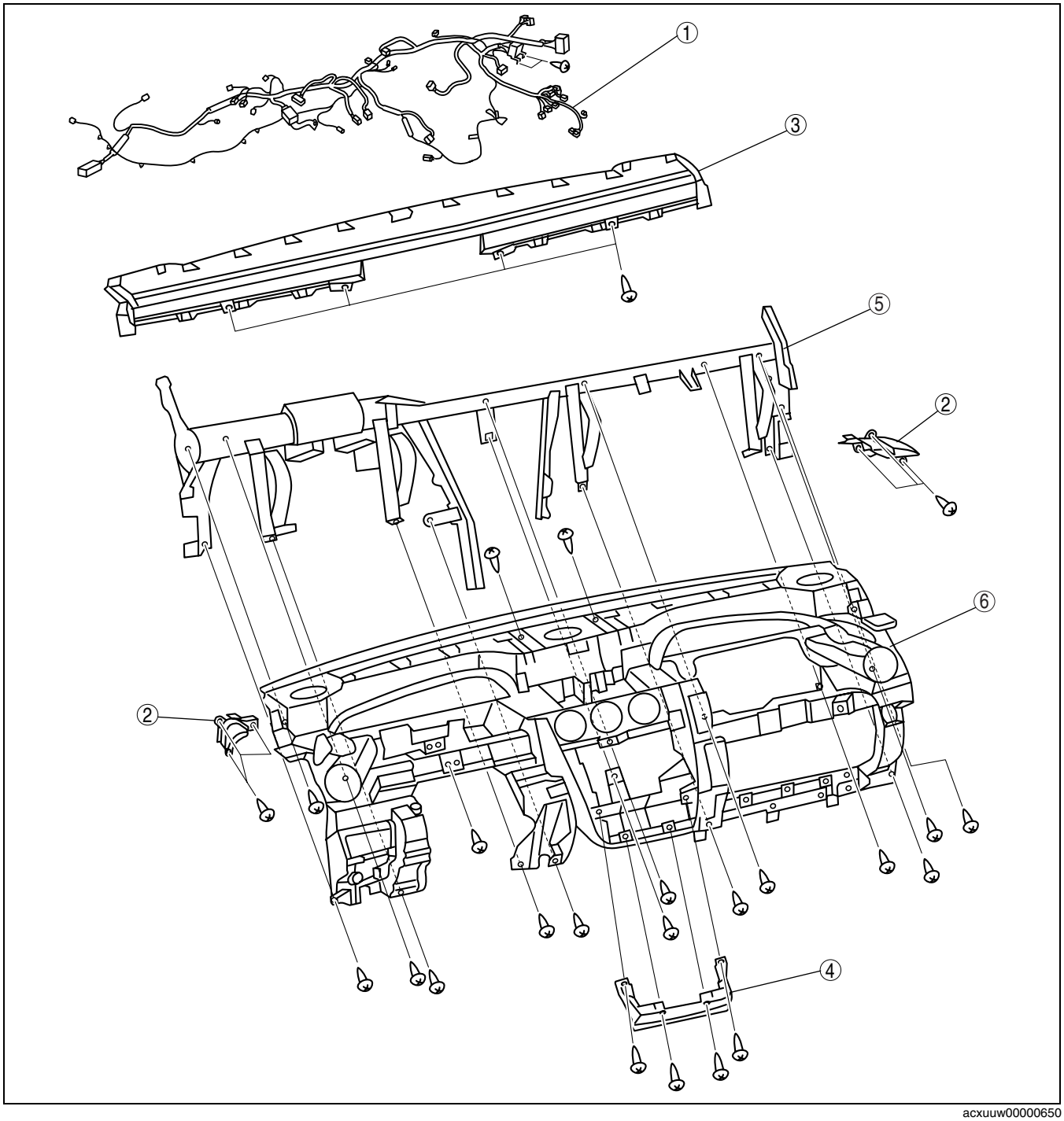
**DASHBOARD DISASSEMBLY/ASSEMBLY**

id091700800400

1. Remove the following parts:
   (1) Passenger-side air bag module (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (2) Information display (See 09-22-15 INFORMATION DISPLAY REMOVAL/INSTALLATION.)
   (3) Front speaker (See 09-20-8 FRONT SPEAKER REMOVAL/INSTALLATION.)
   (4) Center speaker (See 09-20-9 CENTER SPEAKER REMOVAL/INSTALLATION.)
2. Disassemble in the order indicated in the table.

3. Assemble in the reverse order of disassembly.

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| | |
|---|---|
| 1 | Dashboard wiring harness |
| 2 | Demister duct |
| 3 | Upper garnish |

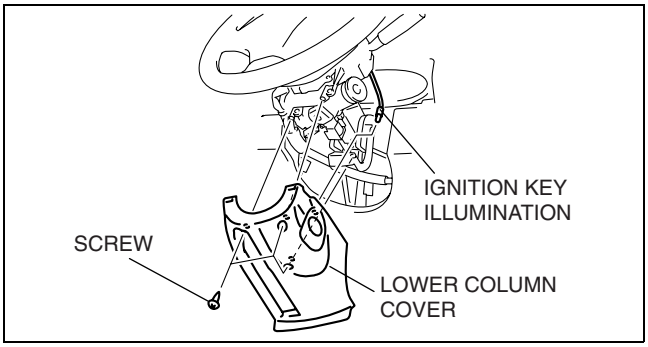
| | |
|---|---|
| 4 | Dashboard center panel |
| 5 | Dashboard member |
| 6 | Dashboard |

## COLUMN COVER REMOVAL/INSTALLATION

id091700800800

1. Remove the screws.
2. Pull the upper column cover upward and detach the upper column cover from the lower column cover.
3. Remove the lower column cover.
4. Remove the ignition key illumination.
5. Install in the reverse order of removal.

**Note**
- The upper column cover is integrated with the meter hood.

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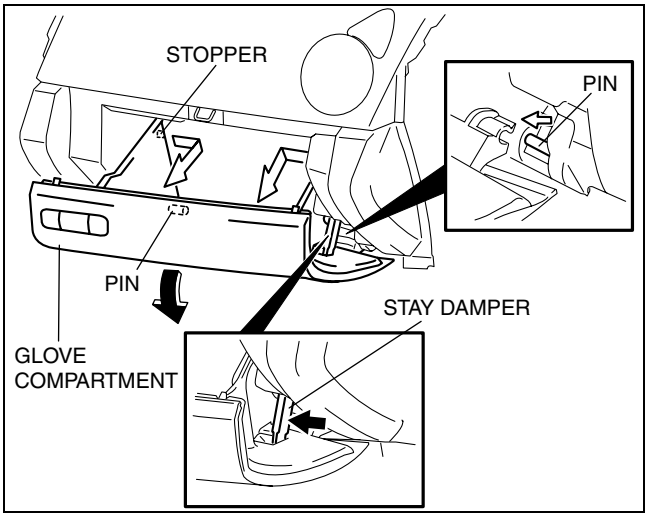
## GLOVE COMPARTMENT REMOVAL/INSTALLATION

id091700800700

1. Press the stay damper in the direction shown by the arrow and detach it from the glove compartment lid.
2. Bend the stoppers inward to remove.
3. Turn the glove compartment downward and pull the pins.
4. Remove the glove compartment.
5. Install in the reverse order of removal.

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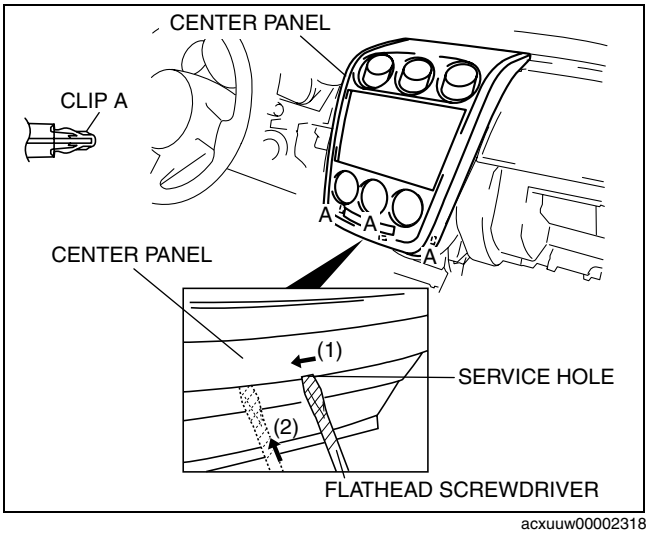
## CENTER PANEL REMOVAL/INSTALLATION

id091700804500

1. Remove the following parts:
   (1) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
2. Insert a tape-wrapped flathead screwdriver into the service hole and slide it in the direction of arrow (1).
3. After sliding the flathead screwdriver, insert it in the direction of arrow (2) and remove clip A.

**Caution**
- **Insert a flathead screwdriver until clip A can be removed while being careful not to allow the climate control unit to be damaged.**

4. Remove clip A on the opposite side in the same procedure.

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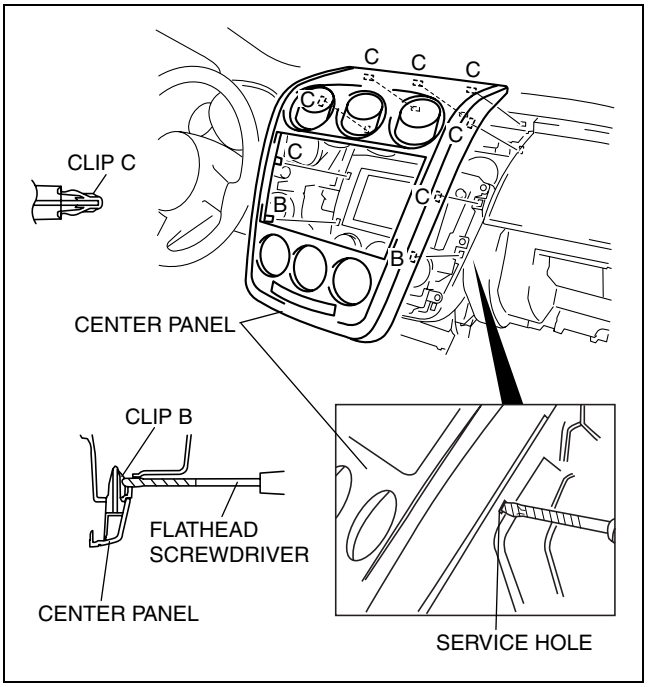
5. Insert a tape-wrapped flathead screwdriver into the service hole and lift up the center panel with clips B pressed in, then remove clips B.
6. Pull the center panel outward and detach clips C.
7. Remove the center panel.
8. Install in the reverse order of removal.

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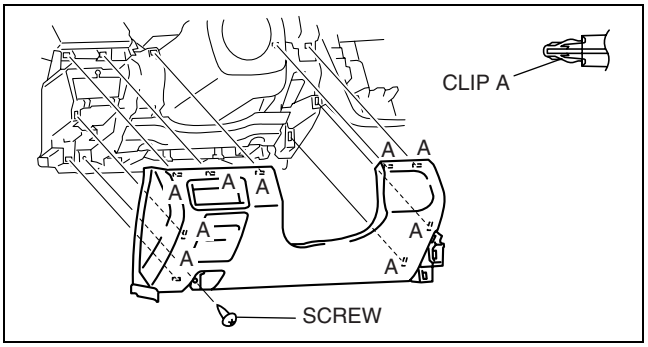
**LOWER PANEL REMOVAL/INSTALLATION**

id091700801100

**Driver's Side**

1. Remove the following parts:
   (1) Front scuff plate inner (driver's side) (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (driver's side) (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
2. Remove the screws.
3. Pull the lower panel outward and detach clips A.
4. Remove the passenger compartment temperature sensor. (See 07-40-23 PASSENGER COMPARTMENT TEMPERATURE SENSOR REMOVAL/INSTALLATION.)
5. Disconnect the headlight leveling switch connector and TCS OFF switch connector.
6. Remove the lower panel.
7. Install in the reverse order of removal.

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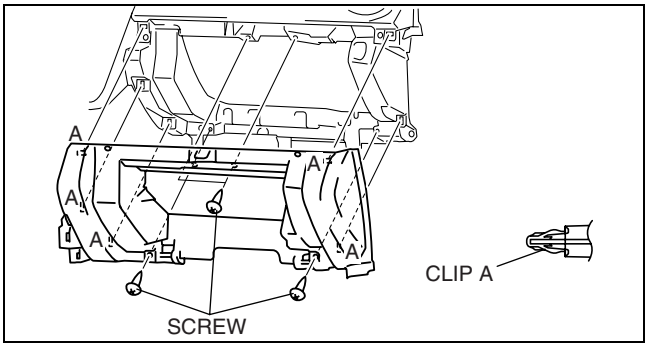
**Passenger's Side**

1. Remove the following parts:
   (1) Front scuff plate inner (passenger's side) (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (passenger's side) (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
2. Remove the screws.
3. Pull the lower panel outward and detach clips A.
4. Remove the lower panel.
5. Install in the reverse order of removal.

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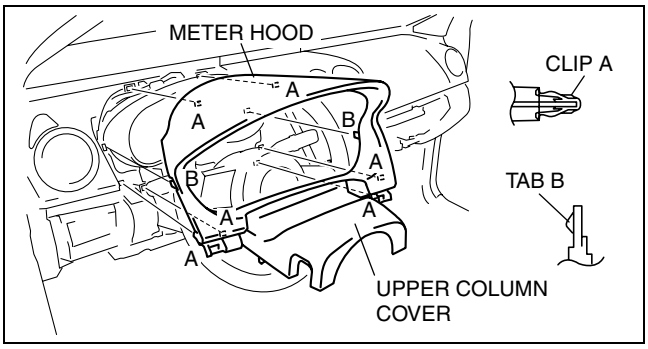
**METER HOOD REMOVAL/INSTALLATION**

id091700800900

1. Remove the following parts:
   (1) Front scuff plate inner (driver's side) (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (driver's side) (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
2. Pull the upper column cover upward and detach the upper column cover from the lower column cover.
3. Pull the meter hood and remove clips A and tabs B.
4. Remove the meter hood.
5. Install in the reverse order of removal.

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**VENTILATOR GRILLE REMOVAL/INSTALLATION**

id091700804600

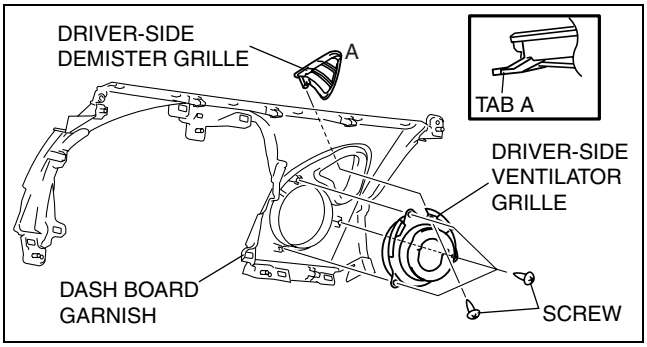
**Warning**

- **Handling the air bag module improperly can accidentally operate (deploy) the air bag module, which may seriously injure you. Read the service warnings and cautions before handling the air bag module. (See 08-10-3 AIR BAG SYSTEM SERVICE WARNINGS.) (See 08-10-5 AIR BAG SYSTEM SERVICE CAUTIONS.)**

**Driver's Side**

1. Remove the following parts:
   (1) A-pillar lower trim (driver's side) (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (driver's side) (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (6) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (10) Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (11) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (12) Dash board garnish (See 09-17-18 DASHBOARD GARNISH REMOVAL/INSTALLATION.)

2. Remove the screws.
3. Remove the ventilator grille.
4. Remove the tab A.
5. Remove the demister grille.
6. Install in the reverse order of removal.

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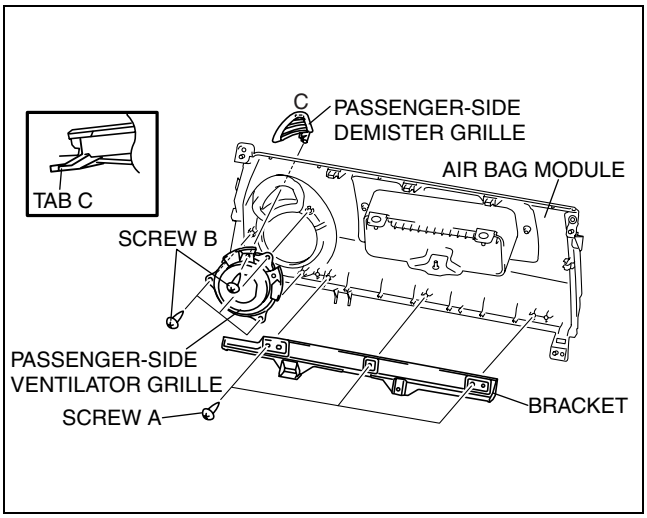
**Passenger's Side**

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) A-pillar lower trim (passenger's side) (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (passenger's side) (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (6) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10) Passenger-side air bag module (See 08-10-7 PASSENGER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove the screws A.
4. Remove the bracket.
5. Remove the screws B.
6. Remove the ventilator grille.
7. Remove the tab C.
8. Remove the demister grille.
9. Install in the reverse order of removal.

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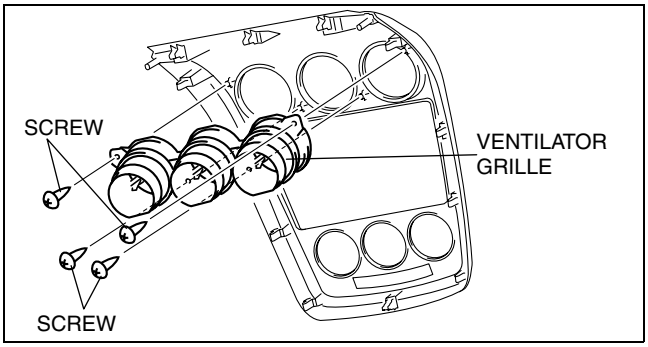
**Center**

1. Remove the following parts:
   (1) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
2. Remove the screws.
3. Remove the ventilator grille.
4. Install in the reverse order of removal.

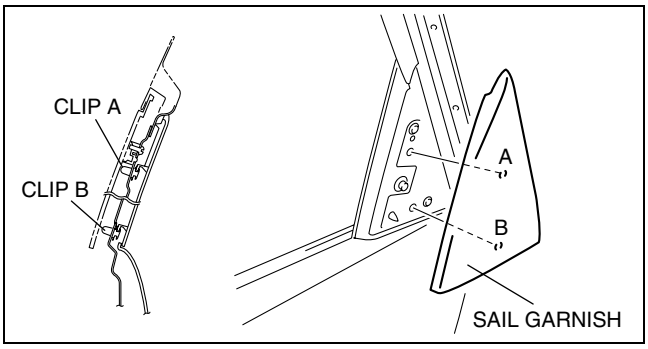



acxuuw00000881

**SAIL GARNISH REMOVAL/INSTALLATION**

id091700805000

1. Pull the sail garnish outward and detach clips A and B.
2. Remove the sail garnish.
3. Install in the reverse order of removal.

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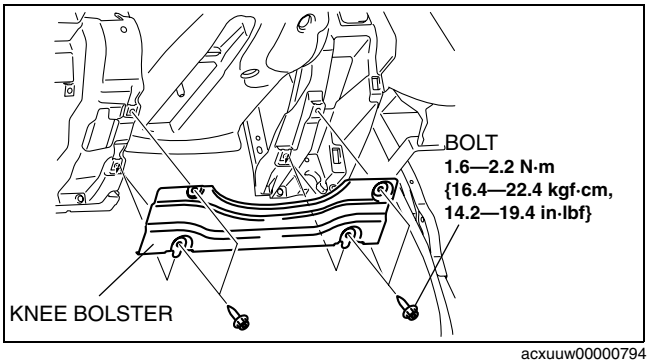
**KNEE BOLSTER REMOVAL/INSTALLATION**

id091700804000

1. Remove the following parts:
   (1) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (driver's side) (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (driver's side) (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (driver's side) (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
2. Remove the bolts.
3. Remove the knee bolster.
4. Install in the reverse order of removal.

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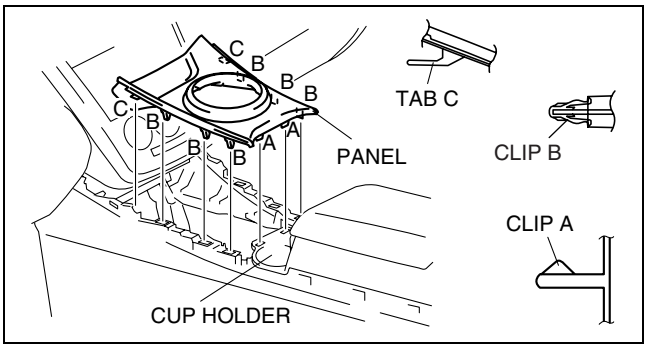
## CONSOLE REMOVAL/INSTALLATION

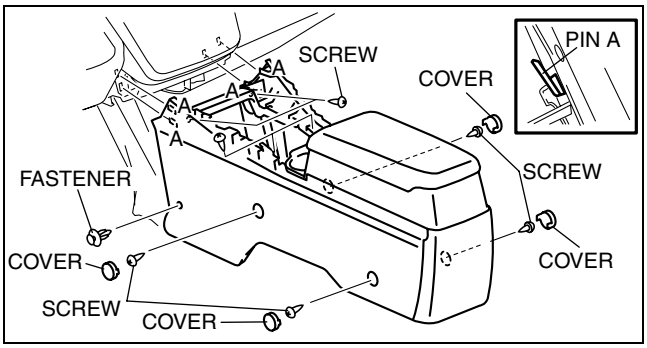
id091700801200

1. Disconnect the negative battery cable.
2. Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
3. Pull the panel upward and detach clips A, B and tabs C.
4. Disconnect the accessory socket connector.
5. Disconnect the seat warmer switch connectors. (vehicles with seat warmer system)
6. Remove the panel.




acxuuw00000666

7. Remove the covers.
8. Remove the fasteners and screws.
9. Remove the pins A.
10. Remove the console.
11. Install in the reverse order of removal.

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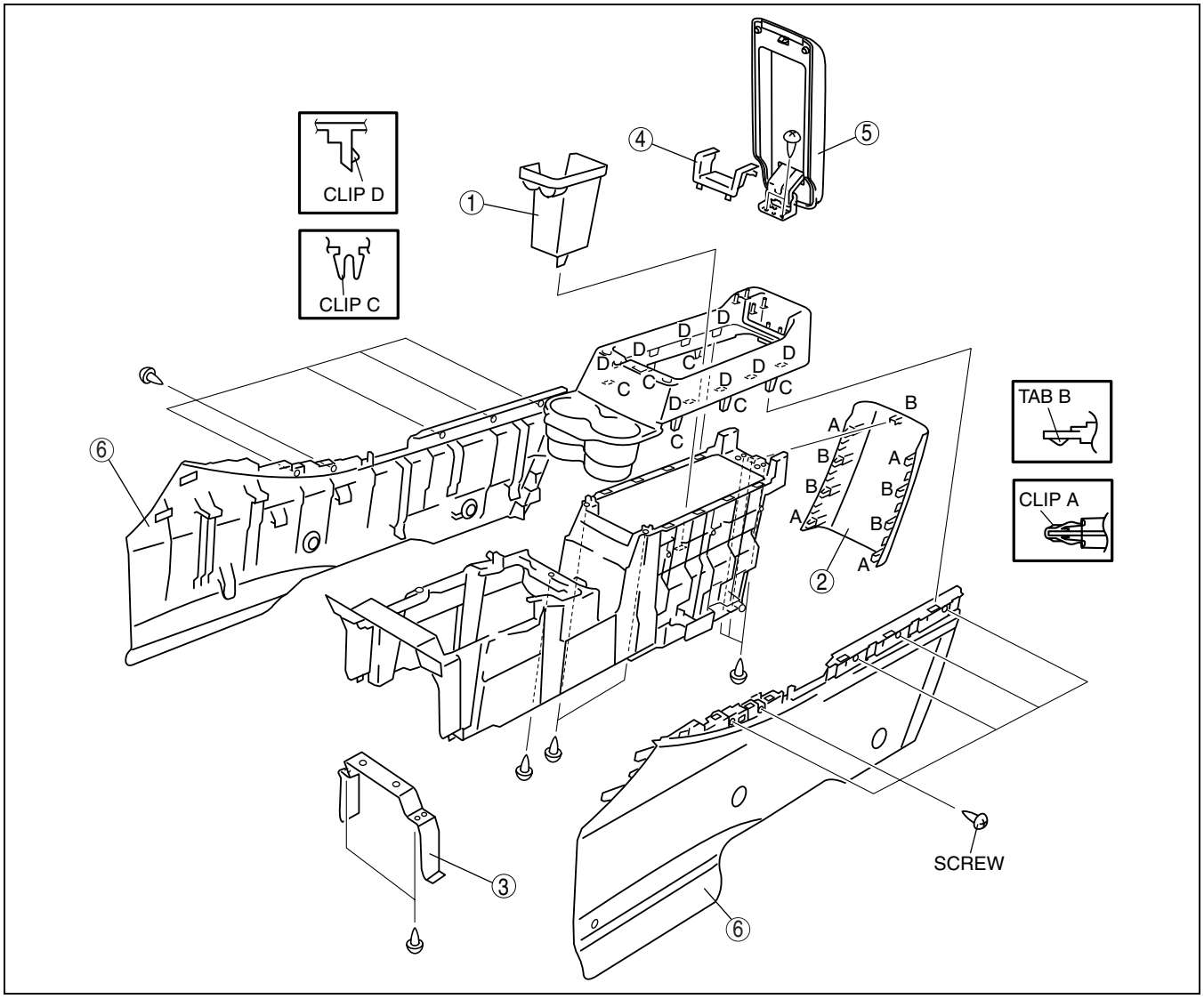
## CONSOLE DISASSEMBLY/ASSEMBLY

id091700801300

1. Disassemble in the order indicated in the table.

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| | |
|---|---|
| 1 | Storage box |
| 2 | Console cover |
| 3 | Bracket |

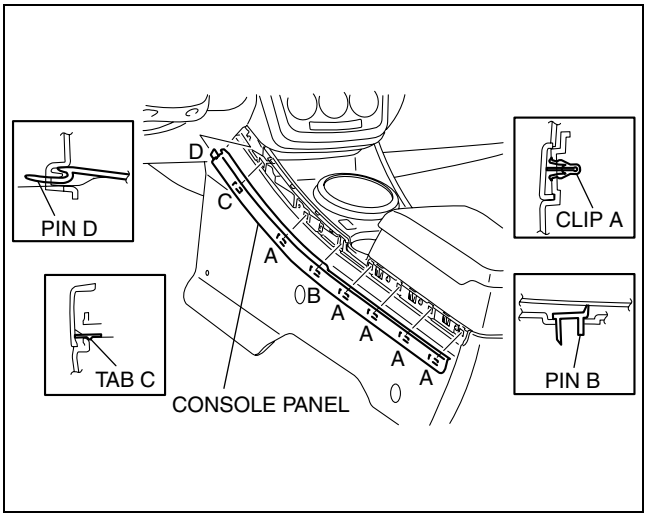
| | |
|---|---|
| 4 | Hole cover |
| 5 | Console lid |
| 6 | Console |

2. Assemble in the reverse order of disassembly.

## CONSOLE PANEL REMOVAL/INSTALLATION

id091700804100

1. Detach clips A from the console using a tape-wrapped flathead screwdriver.
2. Remove the pin B and tab C.
3. Remove the pin D.
4. Remove the console panel.
5. Install in the reverse order of removal.

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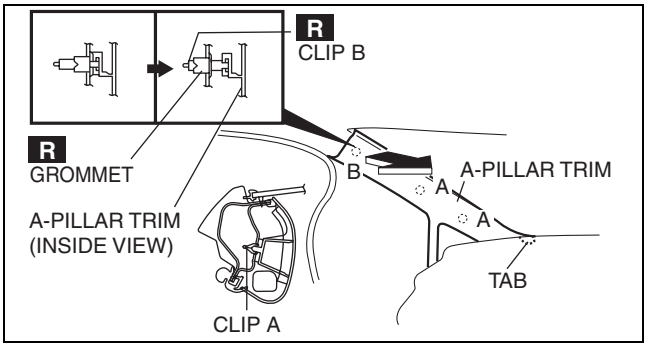
## A-PILLAR TRIM REMOVAL/INSTALLATION

id091700801900

1. Partially peel back the seaming welt.
2. Pull the A-pillar trim shown in the figure in the direction of the arrow, raise clip B from its grommet together with the A-pillar trim, and remove clips A at the same time.

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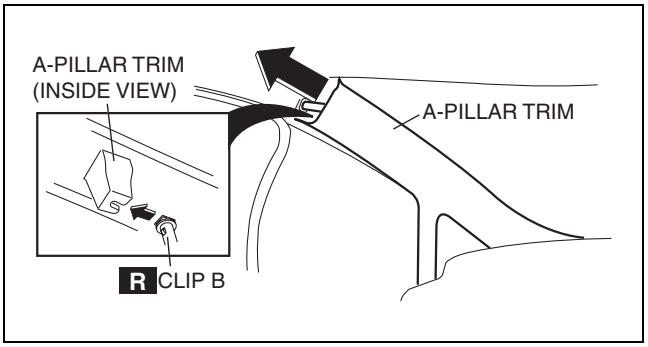
3. Slide the A-pillar trim in the direction of the arrow shown in the figure and remove the A-pillar trim from clip B.

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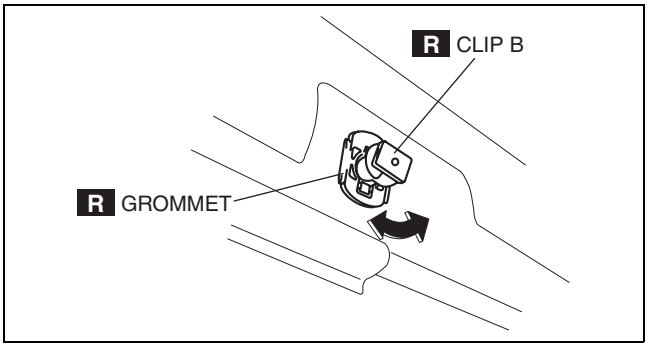
09-17

4. Rotate and pull clip B in the direction of the arrow shown in the figure until it is no longer loose, and feels tight.
5. Pull clip B and remove it from the grommet.

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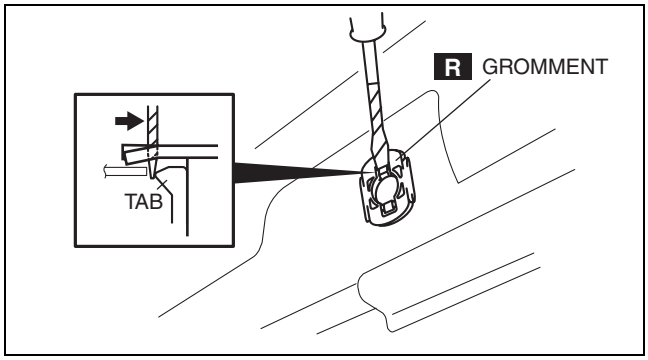
6. Insert a tape-wrapped flathead screwdriver between the body and the grommet.
7. Press the tabs and remove the grommet.
8. Install the new grommet to the body.
9. Install the new clip B to the A-pillar trim.
10. Install the A-pillar trim.

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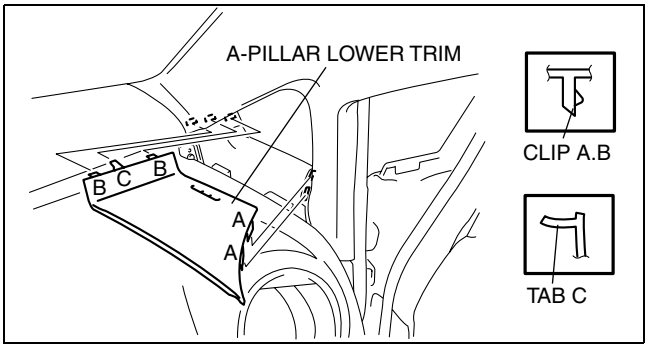
### A-PILLAR LOWER TRIM REMOVAL/INSTALLATION

id091700804400

1. Pull the A-pillar lower trim upward and detach clips A from the dashboard.
2. Pull the A-pillar lower trim outward and detach clips B and tab C.
3. Remove the A-pillar lower trim.
4. Install in the reverse order of removal.

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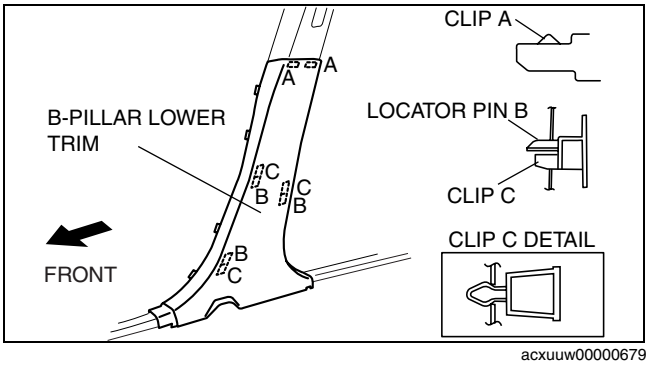
### B-PILLAR LOWER TRIM REMOVAL/INSTALLATION

id091700802000

1. Remove the front scuff plate inner. (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
2. Remove the rear scuff plate inner. (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
3. Partially peel back the seaming welt.
4. Pull the B-pillar lower trim outward and detach clips A, C and locator pins B.
5. Remove the B-pillar lower trim.
6. Install in the reverse order of removal.

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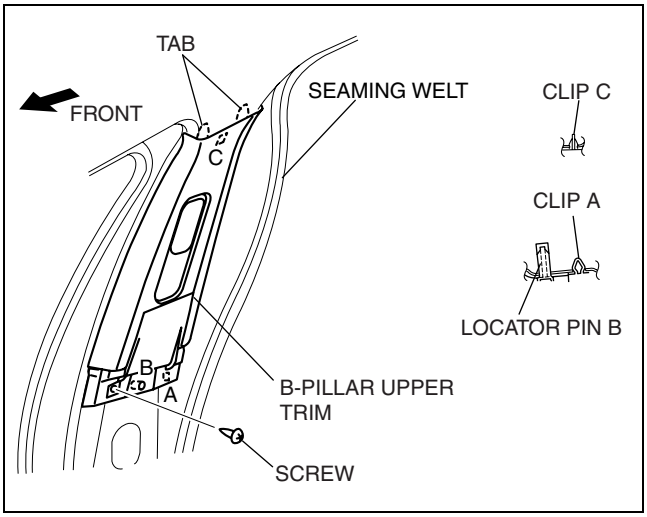
## B-PILLAR UPPER TRIM REMOVAL/INSTALLATION

id091700802100

1. Remove the following parts:
   (1) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (2) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (3) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
2. Partially peel back the seaming welt.
3. Remove the screw.
4. Pull the B-pillar upper trim outward and detach clip A and locator pin B.
5. Pull the B-pillar upper trim downward and detach the tabs and clip C.
6. Remove the B-pillar upper trim.

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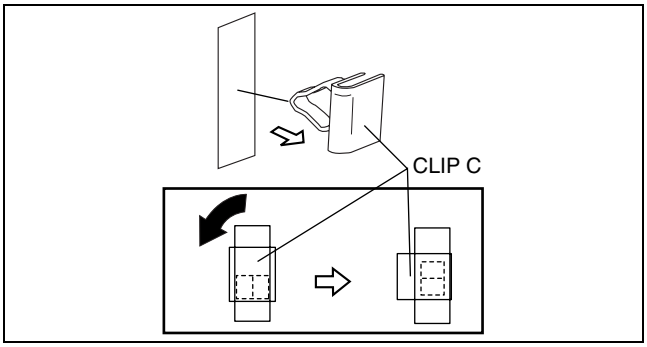
7. Turn the clip installed on the body **90**° in the direction indicated by the arrow in the figure and pull them out.
8. Remove clip C from the body, then install it to the B-pillar upper trim.
9. Install in the reverse order of removal.

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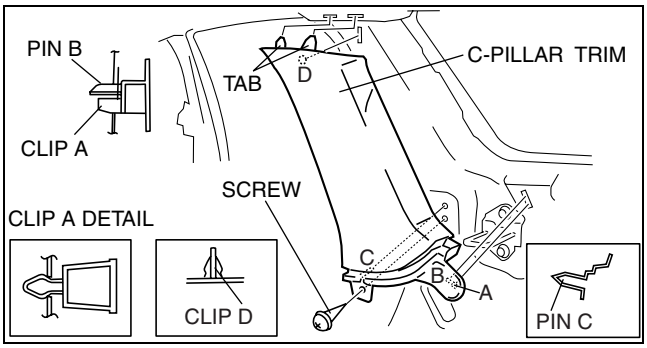
**C-PILLAR TRIM REMOVAL/INSTALLATION**

id091700802200

1. Remove the following parts:
   (1) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
2. Partially peel back the seaming welt.
3. Remove the screw.
4. Pull the C-pillar trim outward and detach clip A and pins B, C.
5. Pull the C-pillar upper trim downward and detach the tabs and clip D.
6. Remove the C-pillar trim.

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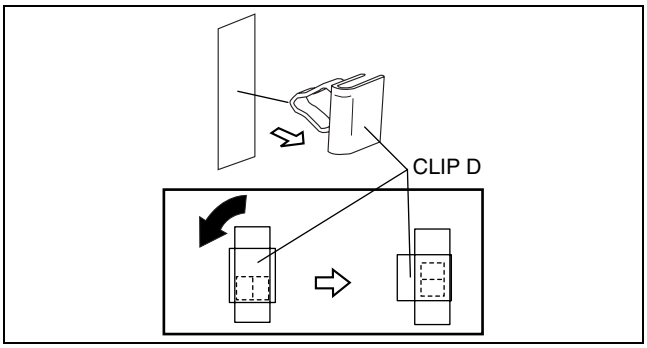
7. Turn the clip installed on the body **90**° in the direction indicated by the arrow in the figure and pull them out.
8. Remove clip D from the body, then install it to the C-pillar trim.
9. Install in the reverse order of removal.

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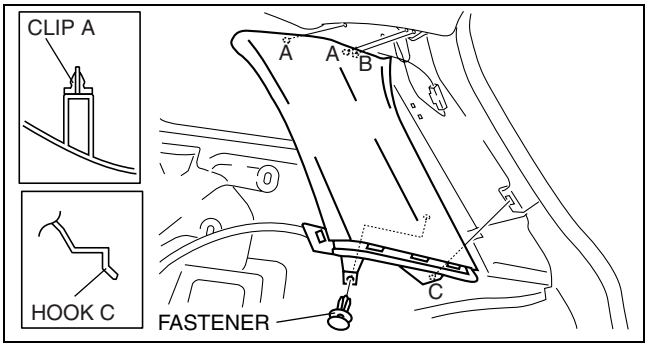
### D-PILLAR TRIM REMOVAL/INSTALLATION

id091700802300

1. Remove the following parts:
   (1) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
2. Partially peel back the seaming welt.
3. Remove the fastener.
4. Pull the D-pillar trim outward and detach clips A and pin B.
5. Pull the D-pillar trim upward and detach hook C.
6. Remove the D-pillar trim.
7. Install in the reverse order of removal.

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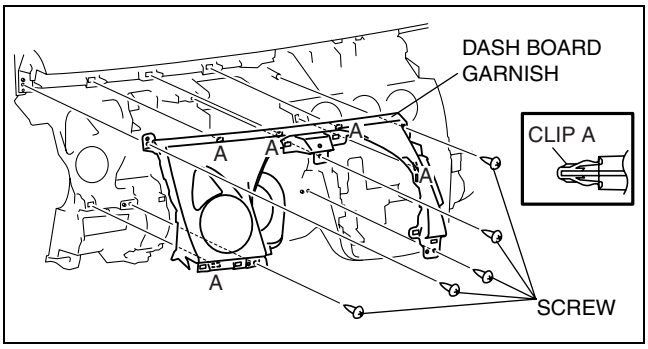
### DASHBOARD GARNISH REMOVAL/INSTALLATION

id091700804700

1. Remove the following parts:
   (1) A-pillar lower trim (driver's side) (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (driver's side) (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (6) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (10)Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (11)Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
2. Remove the screws.
3. Pull the dashboard garnish outward and detach clips A.
4. Install in the reverse order of removal.

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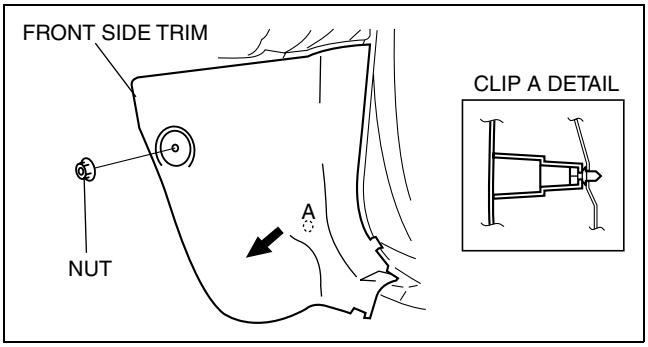
### FRONT SIDE TRIM REMOVAL/INSTALLATION

id091700802400

1. Remove the front scuff plate inner. (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
2. Partially peel back the seaming welt.
3. Remove the nut.
4. Pull the front side trim in the direction shown by the arrow, then detach clip A.
5. Remove the front side trim.
6. Install in the reverse order of removal.

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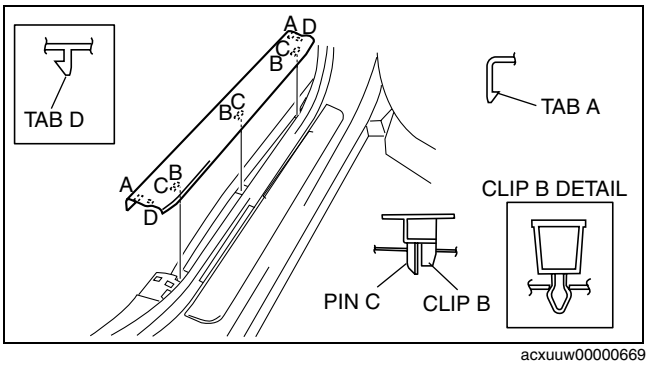
## FRONT SCUFF PLATE REMOVAL/INSTALLATION

id091700801400

### Front Scuff Plate Inner

1. Pull the front scuff plate inner upward while detaching tabs A, detach clips B, pins C and tab D from the body, and then remove the front scuff plate inner.
2. Install in the reverse order of removal.

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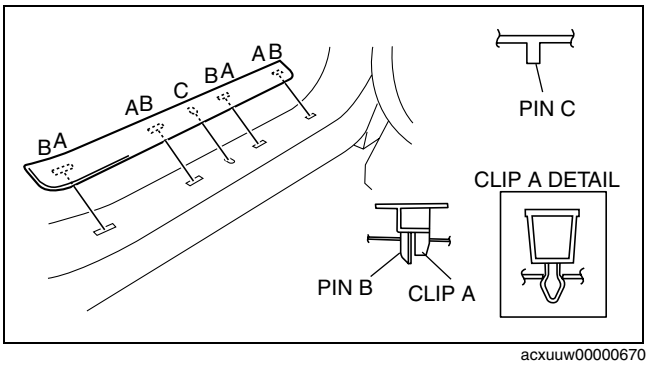
### Front Scuff Plate Outer

1. Pull the front scuff plate outer upward, detach clips A, pins B and C from the body, and then remove the front scuff plate outer.
2. Install in the reverse order of removal.

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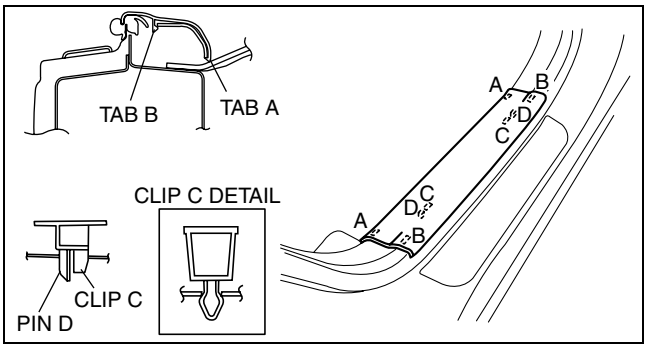
## REAR SCUFF PLATE REMOVAL/INSTALLATION

id091700801500

### Rear Scuff Plate Inner

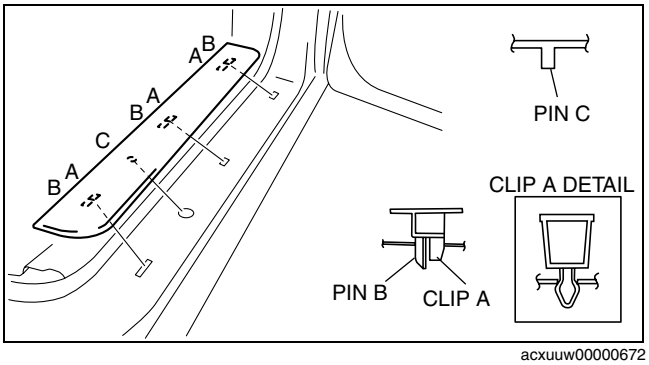
1. Pull the rear scuff plate inner upward while detaching tabs A and B, detach clips C, pins D from the body, and then remove the rear scuff plate inner.
2. Install in the reverse order of removal.




acxuuw00000671

### Rear Scuff Plate Outer

1. Pull the rear scuff plate outer upward, detach clips A, pins B and C from the body, and then remove the rear scuff plate outer.
2. Install in the reverse order of removal.

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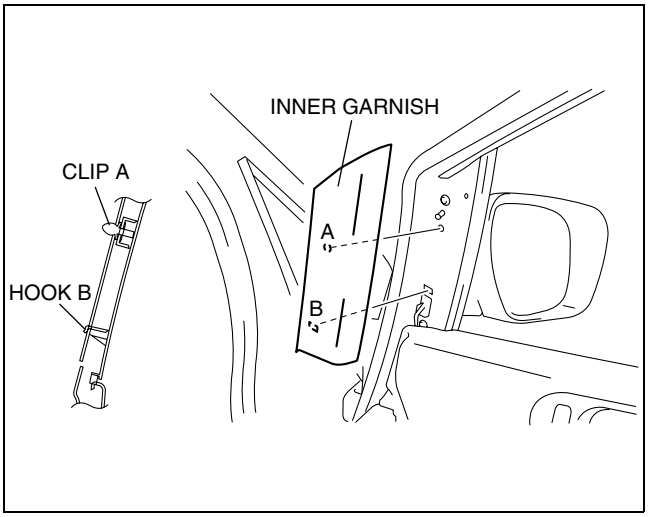
## INNER GARNISH REMOVAL/INSTALLATION

id091700801000

1. Pull the inner garnish outward and detach clips A.
2. Remove the hook B.
3. Remove the inner garnish.
4. Install in the reverse order of removal.

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## FRONT DOOR TRIM REMOVAL/INSTALLATION

id091700802500

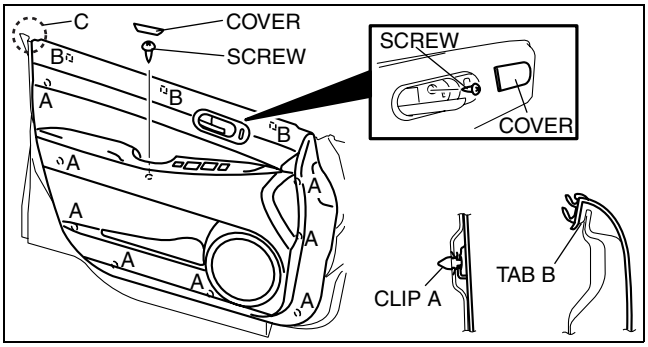
**Driver's Side**

1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Remove the covers, then remove screws.
4. Detach clips A from the door trim using fastener remover.
5. Pull the door trim upward and detach tabs B from the door.

**Caution**

- **Remove the front door trim being careful not to scratch area C of the sash film.**

6. Disconnect the power door mirror switch connector and the power window main switch connector.
7. Disconnect the door lock switch connector.
8. Remove the inner handle cover.
9. Remove the front door trim.
10. Install in the reverse order of removal.

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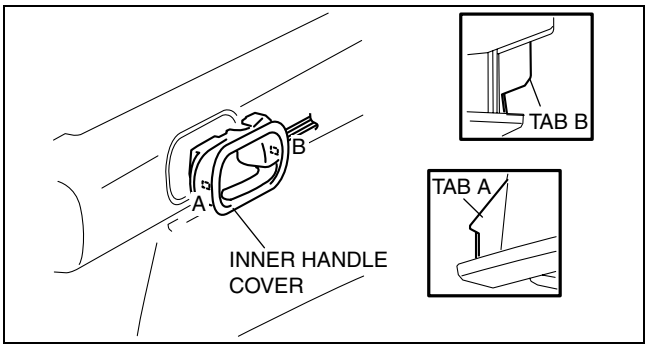



acxuuw00000751

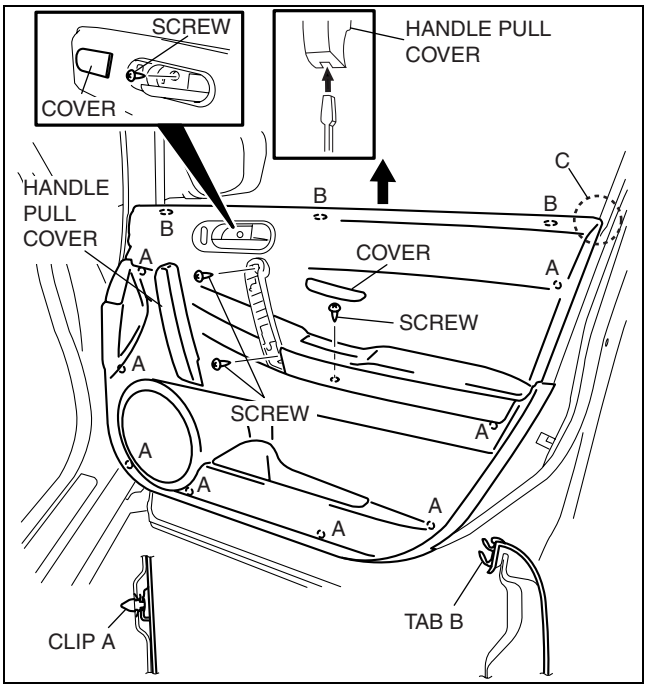
**Passenger's Side**

1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Detach handle pull cover using a tape-wrapped flathead screwdriver as shown in the figure.
4. Remove the cover, then remove screws.
5. Detach clips A from the door trim using fastener remover.
6. Pull the door trim upward and detach tabs B from the door.

**Caution**

- **Remove the front door trim being careful not to scratch area C of the sash film.**

7. Disconnect the power window subswitch connector.

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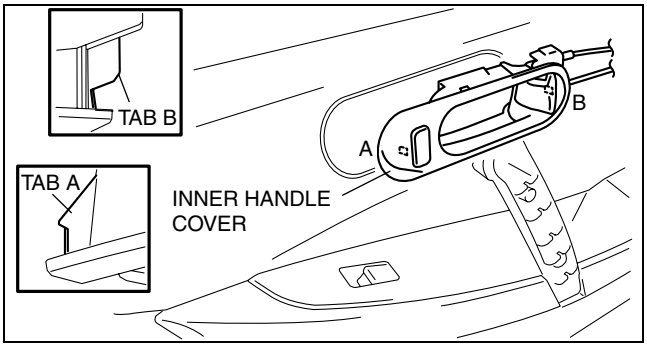
8. Disconnect the door lock switch connector.
9. Remove the inner handle cover.
10. Remove the front door trim.
11. Install in the reverse order of removal.

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## FRONT DOOR TRIM DISASSEMBLY/ASSEMBLY

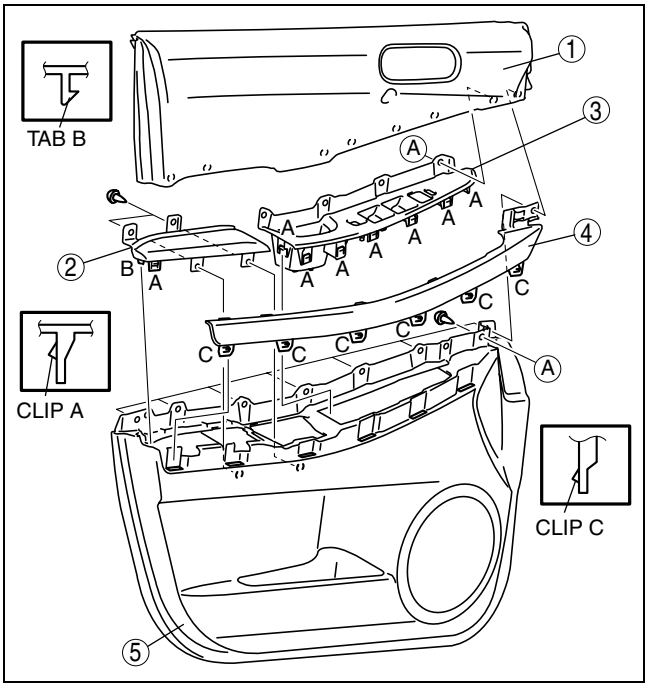
id091700804200

### Driver's Side

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Front door trim upper |
| 2 | Armrest |
| 3 | Switch panel |
| 4 | Front door decoration panel |
| 5 | Front door trim lower |

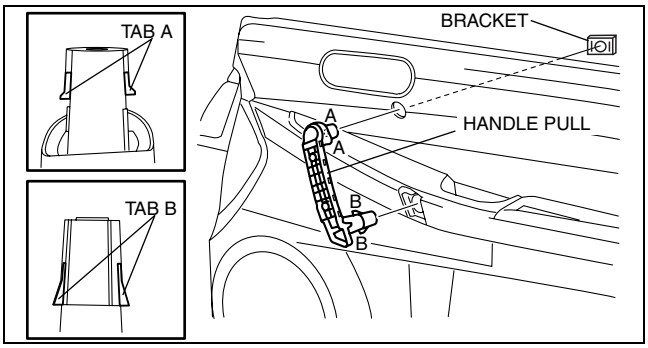
2. Assemble in the reverse order of disassembly.




acxuuw00000884

### Passenger's Side

1. Remove the tab A and B.
2. Remove the bracket.
3. Remove the handle pull.

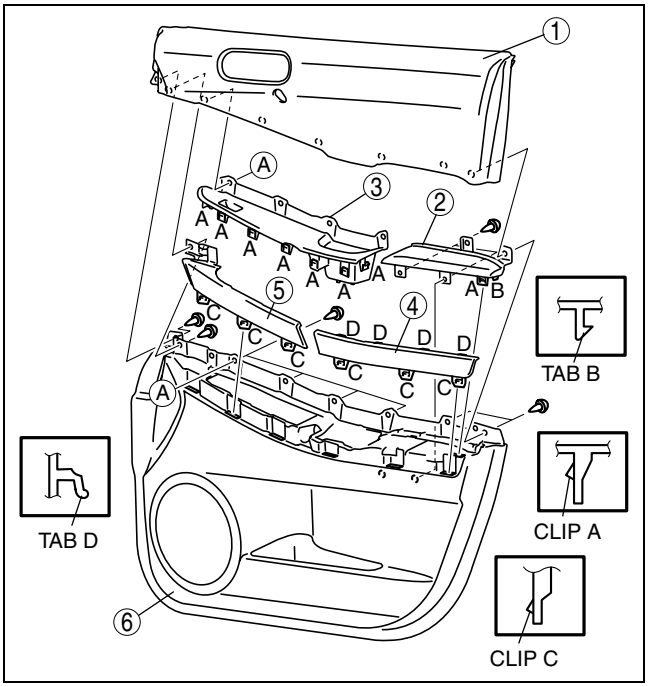



acxuuw00000917

4. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Front door trim upper |
| 2 | Armrest |
| 3 | Switch panel |
| 4 | Front door decoration panel No.1 |
| 5 | Front door decoration panel No.2 |
| 6 | Front door trim lower |

5. Assemble in the reverse order of disassembly.

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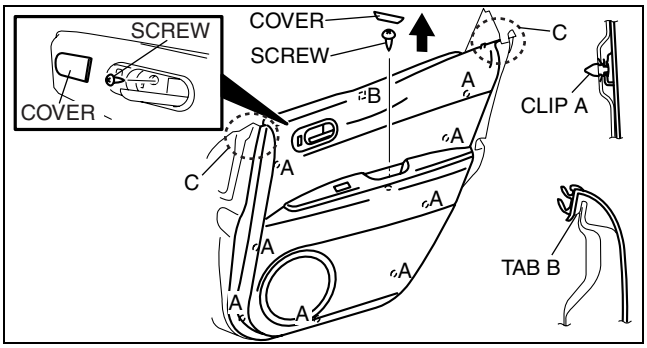
## REAR DOOR TRIM REMOVAL/INSTALLATION

id091700802600

1. Disconnect the negative battery cable.
2. Remove the sail garnish. (See 09-17-12 SAIL GARNISH REMOVAL/INSTALLATION.)
3. Remove the covers.
4. Remove the screws.
5. Detach clips A from the door trim using fastener remover.
6. Pull the door trim upward and detach tabs B from the door.

**Caution**
- **Remove the rear door trim being careful not to scratch areas C of the sash film.**

7. Disconnect the power window subswitch connector.
8. Disconnect the door lock switch connector.
9. Remove the inner handle cover.
10. Remove the rear door trim.
11. Install in the reverse order of removal.

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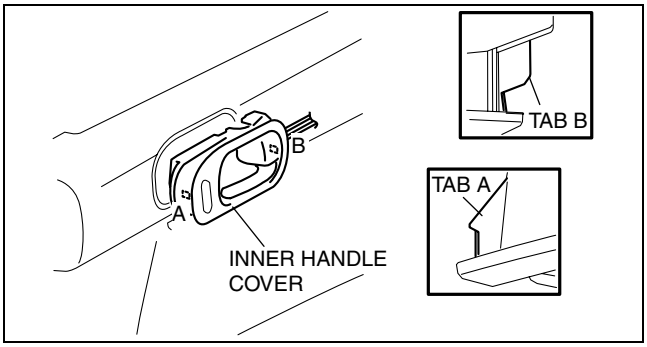


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09-17

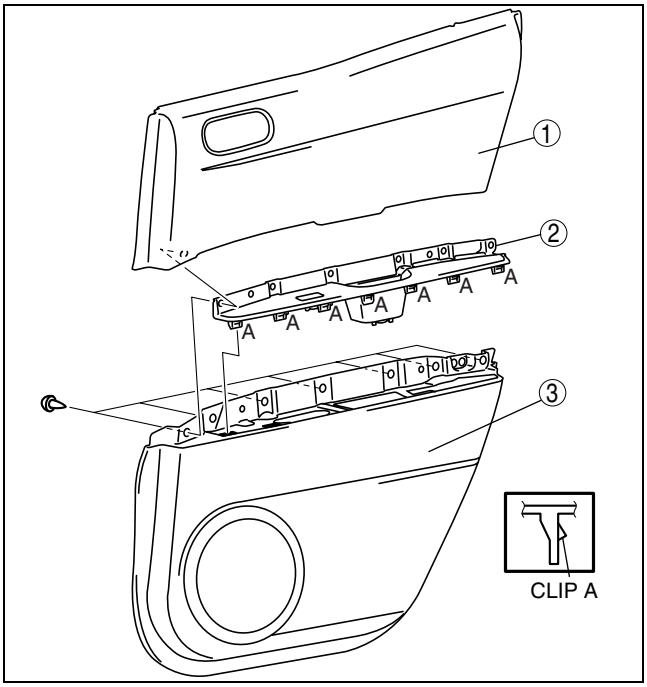
## REAR DOOR TRIM DISASSEMBLY/ASSEMBLY

id091700804300

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Rear door trim upper |
| 2 | Switch panel |
| 3 | Rear door trim lower |

2. Assemble in the reverse order of disassembly.

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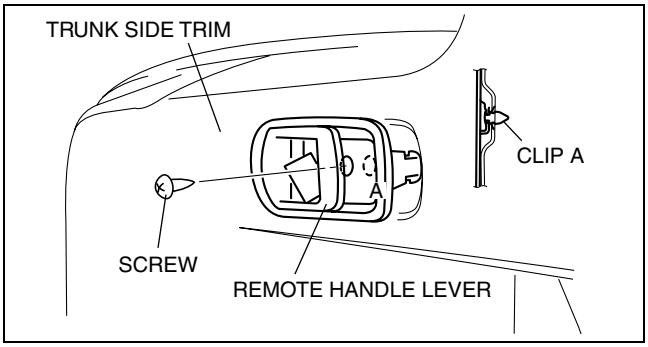
## TRUNK SIDE TRIM REMOVAL/INSTALLATION

id091700803100

1. Remove the following parts:
   (1) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (2) Rear scuff plate inner. (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
2. Remove the screw.
3. Pull the remote handle lever outward and detach clip A.

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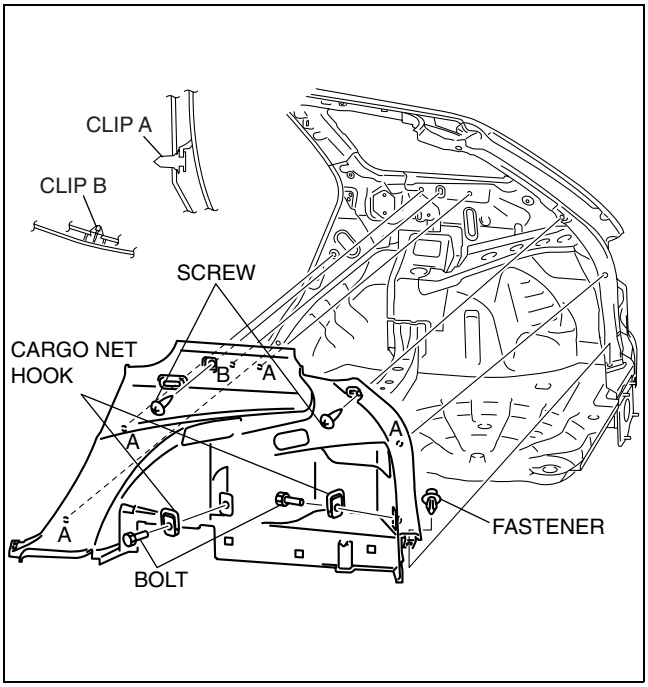
4. Remove the screws and the fastener.
5. Remove the bolt, then remove the cargo net hook.
6. Pull the trunk side trim outward and detach clips A and B.
7. Remove the trunk side trim.
8. Install in the reverse order of removal.

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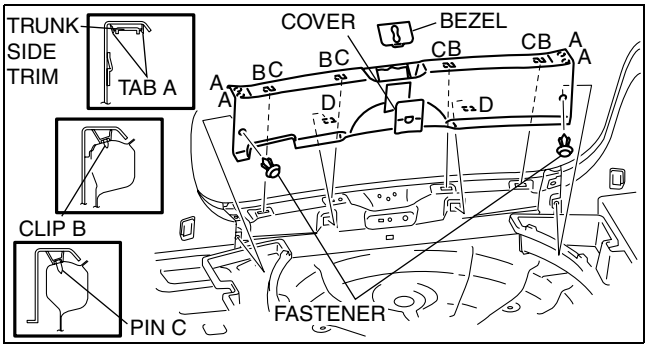
## TRUNK END TRIM REMOVAL/INSTALLATION

id091700803400

1. Remove the sub trunk box. (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION)
2. Remove the fasteners.
3. Pull the trunk end trim upward, then disengage tabs A, clips B and pins C.
4. Remove the tabs D.
5. Remove the trunk end trim.
6. Remove the bezel.
7. Remove the cover.
8. Install in the reverse order of removal.

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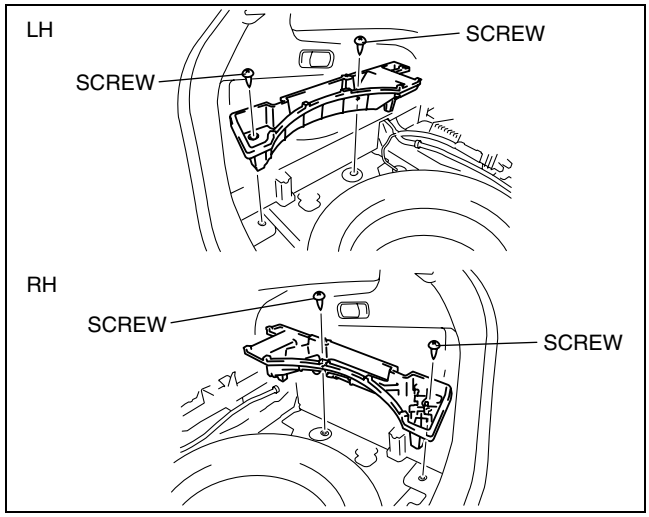
### SUB TRUNK BOX REMOVAL/INSTALLATION

id091700805200

1. Remove the screws.
2. Remove the sub trunk box.
3. Install in the reverse order of removal.

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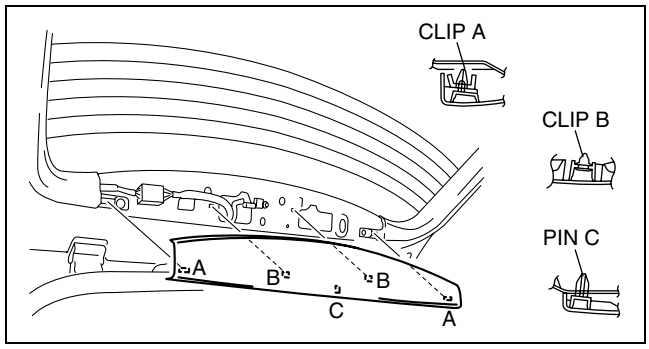
### LIFTGATE UPPER TRIM REMOVAL/INSTALLATION

id091700803600

1. Pull the liftgate upper trim and detach clips A and B, pin C.
2. Remove the liftgate upper trim.
3. Install in the reverse order of removal.

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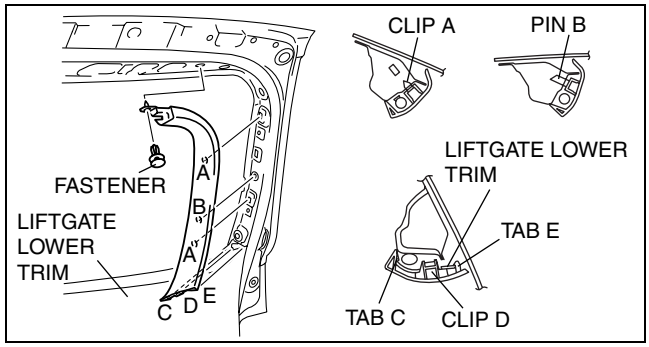
### LIFTGATE SIDE TRIM REMOVAL/INSTALLATION

id091700803700

1. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
2. Remove the fastener.
3. Pull the liftgate side trim toward you, then disengage the clip A and pin B from the body.
4. Remove the tab C, E and clip D.
5. Remove the liftgate side trim.
6. Install in the reverse order of removal.

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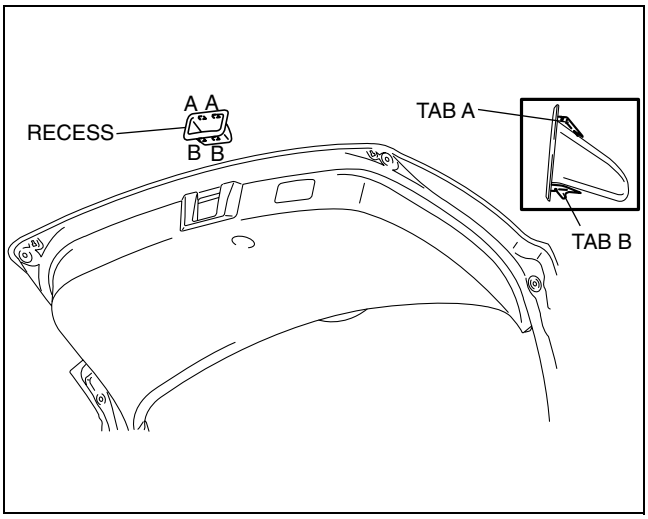
### LIFTGATE LOWER TRIM REMOVAL/INSTALLATION

id091700803800

1. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION)
2. Remove the liftgate side trim. (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION)
3. Pull the recess toward you, then remove it.

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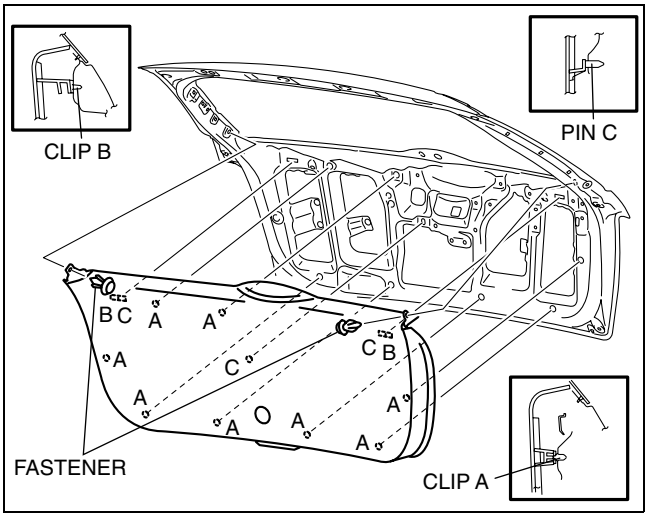
4. Remove the fasteners.
5. Pull the liftgate lower trim toward you, then disengage the clips A, B and pins C from the body.
6. Remove the liftgate lower trim.
7. Install in the reverse order of removal.

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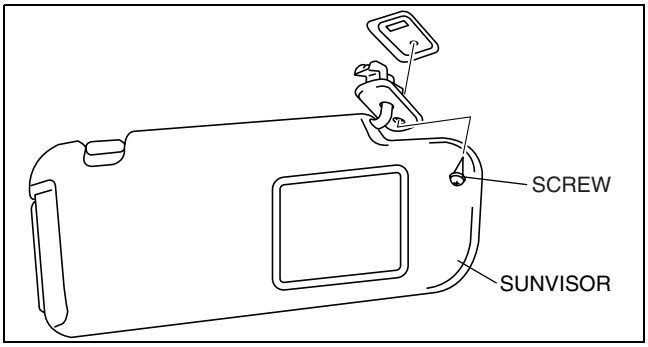
### SUNVISOR REMOVAL/INSTALLATION

id091700801700

1. Remove the screw, then the sunvisor.

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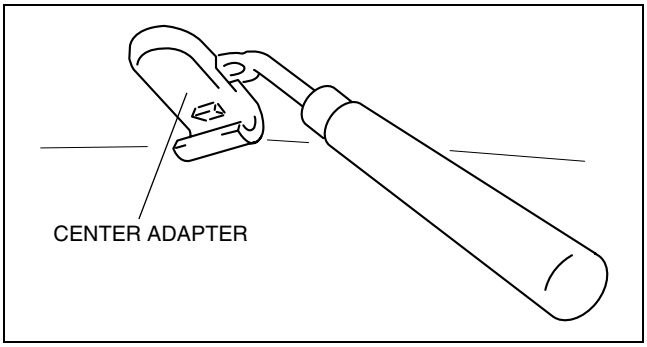
2. Disengage the center adapter (sunvisor stopper) from the body using a fastener remover.
3. Install in the reverse order of removal.

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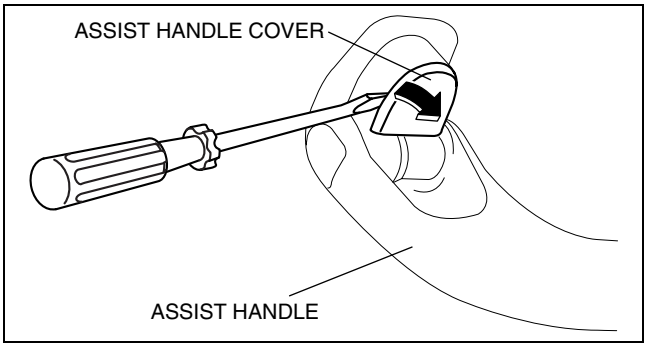
### ASSIST HANDLE REMOVAL/INSTALLATION

id091700801800

1. Insert a screwdriver into the assist handle notch and remove the assist handle cover.

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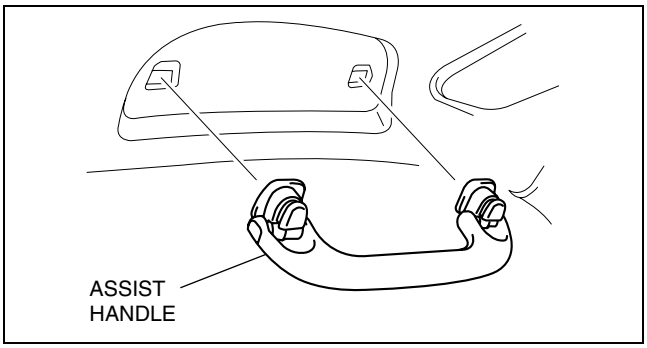
2. Pull the assist handle outward, then remove the assist handle.
3. Install in the reverse order of removal.

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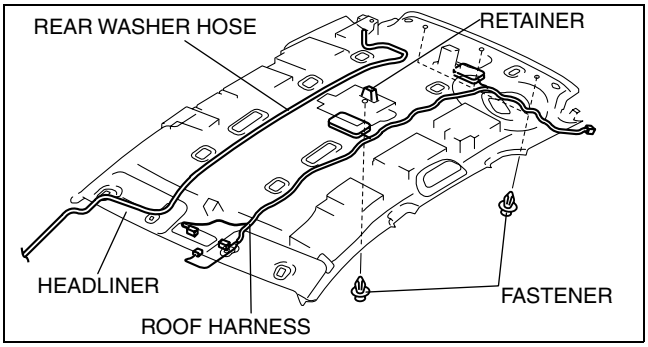
### HEADLINER REMOVAL/INSTALLATION

id091700801600

1. Disconnect the negative battery cable.
2. Partially peel back the seaming welt.
3. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
4. Disconnect the rear washer hose.
5. Disconnect the roof harness connector.

6. Remove the fasteners.
7. Remove the sunroof seaming welt (vehicles with sunroof only)

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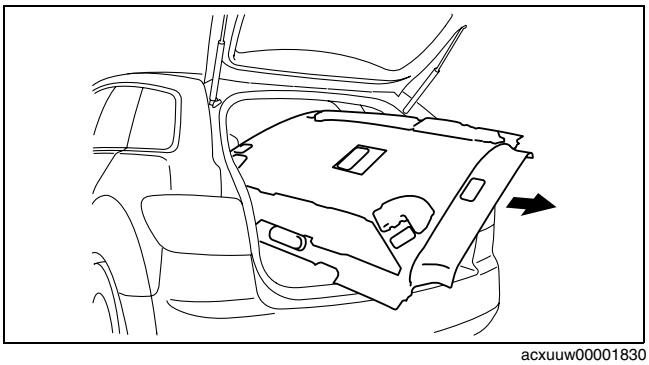
8. Take the headliner out from the opened liftgate.
9. Install in the reverse order of removal.



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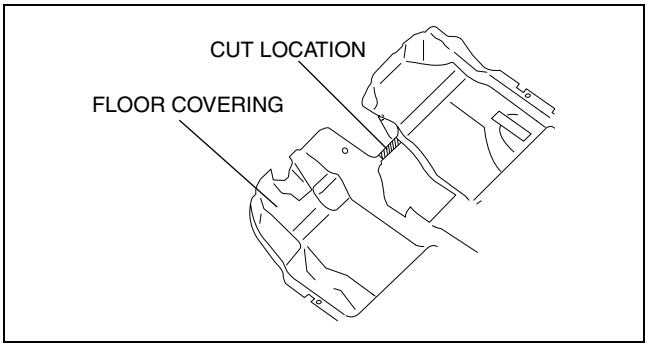
**FLOOR COVERING REMOVAL/INSTALLATION**

id091700803000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front seat (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
   (2) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (3) Joint cover (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (4) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (6) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (7) Console panel (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (8) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (9) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (10) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (11) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (12) Trunk side trim (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION.)
   (13) Selector lever component. (See 05-18-7 SELECTOR LEVER COMPONENT REMOVAL/INSTALLATION.)
   (14) Selector lever component bracket.
   (15) SAS control module. (See 08-10-10 SAS CONTROL MODULE REMOVAL/INSTALLATION.)
   (16) Console bracket.
3. Cut away the floor covering as shown in the figure.

**Note**
- The cut part does not need to match up when installing the floor covering.

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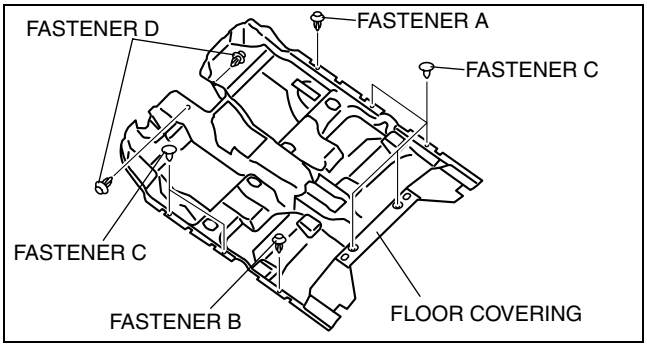
4. Remove fastener A, B, and C.
5. Take the floor covering out from the opened liftgate.
6. Install in the reverse order of removal.



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# 09-18 LIGHTING SYSTEMS


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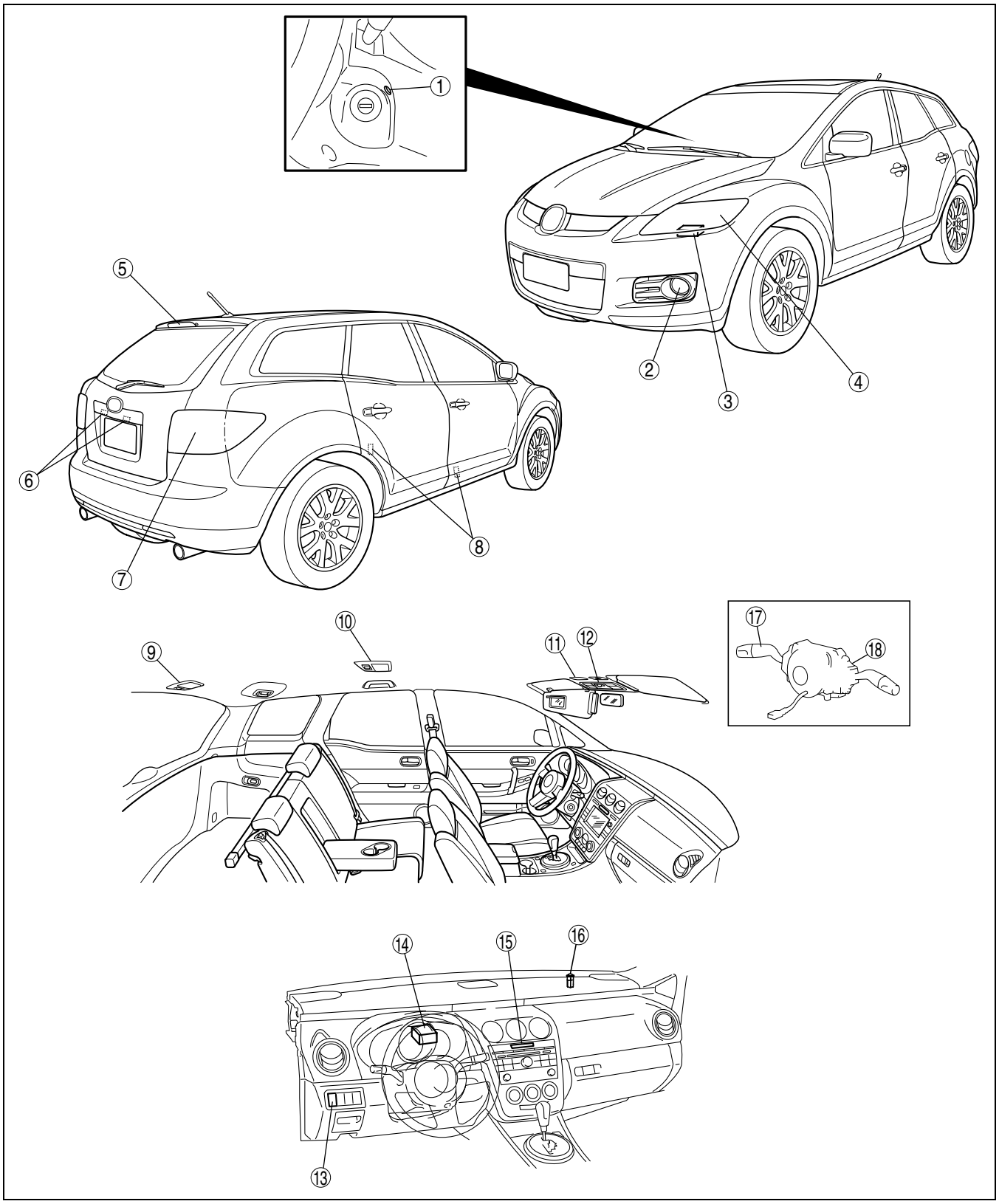
id091800800100

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| | |
|---|---|
| 1 | Ignition key illumination<br>(See 09-18-26 IGNITION KEY ILLUMINATION BULB REMOVAL/INSTALLATION.) |

| | |
|---|---|
| 2 | Front fog light<br>(See 09-18-9 FRONT FOG LIGHT REMOVAL/INSTALLATION.)<br>(See 09-18-9 FRONT FOG LIGHT AIMING.)<br>(See 09-18-11 FRONT FOG LIGHT BULB REMOVAL/INSTALLATION.) |

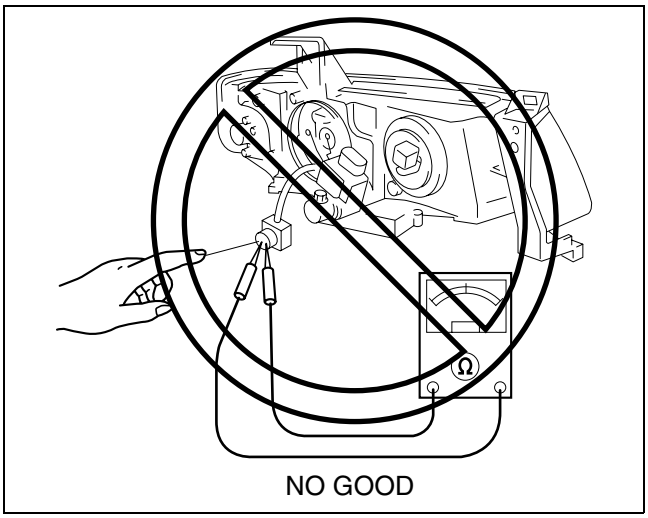
| | |
|---|---|
| 3 | Discharge headlight control module<br>(See 09-18-7 DISCHARGE HEADLIGHT CONTROL MODULE REMOVAL/INSTALLATION.)<br>(See09-18-7 DISCHARGE HEADLIGHT SYSTEM INSPECTION.)<br>(See 09-18-4 DISCHARGE HEADLIGHT SERVICE WARNINGS.) |
| 4 | Front combination light<br>(See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)<br>(See09-18-4 DISCHARGE HEADLIGHT SERVICE WARNINGS.)<br>(See 09-18-5 HEADLIGHT AIMING.)<br>(See 09-18-6 HEADLIGHT BULB REMOVAL/INSTALLATION.)<br>(See 09-18-9 PARKING/FRONT TURN LIGHT BULB REMOVAL/INSTALLATION.)<br>(See 09-18-9 FRONT SIDE MARKER LIGHT BULB REMOVAL/INSTALLATION.) |
| 5 | High-mount brake light<br>(See 09-18-12 HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION.) |
| 6 | License plate light<br>(See 09-18-12 LICENSE PLATE LIGHT REMOVAL/INSTALLATION.) |
| 7 | Rear combination light<br>(See 09-18-11 REAR COMBINATION LIGHT REMOVAL/INSTALLATION.)<br>(See 09-18-12 REAR COMBINATION LIGHT BULB REMOVAL/INSTALLATION.) |
| 8 | Door switch<br>(See09-18-26 DOOR SWITCH REMOVAL/INSTALLATION)<br>(See09-18-27 DOOR SWITCH INSPECTION.) |
| 9 | Cargo compartment light<br>(See09-18-25 CARGO COMPARTMENT LIGHT REMOVAL/INSTALLATION.)<br>(See09-18-25 CARGO COMPARTMENT LIGHT INSPECTION.) |
| 10 | Interior light<br>(See 09-18-23 INTERIOR LIGHT REMOVAL/INSTALLATION.)<br>(See 09-18-23 INTERIOR LIGHT BULB REMOVAL/INSTALLATION.)<br>(See 09-18-24 INTERIOR LIGHT INSPECTION.) |
| 11 | Spot light<br>(See 09-18-26 SPOT LIGHT REMOVAL/INSTALLATION.) |
| 12 | Map light<br>(See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)<br>(See 09-18-23 MAP LIGHT INSPECTION.) |
| 13 | Headlight leveling switch<br>(See 09-18-16 HEADLIGHT LEVELING SWITCH REMOVAL/INSTALLATION.)<br>(See 09-18-16 HEADLIGHT LEVELING SWITCH INSPECTION.) |
| 14 | Auto light control module<br>(See 09-18-19 AUTO LIGHT CONTROL MODULE REMOVAL/INSTALLATION.)<br>(See 09-18-20 AUTO LIGHT CONTROL MODULE INSPECTION.)<br>(See 09-18-17 DRL AND AUTO LIGHT SYSTEM WIRING DIAGRAM.) |
| 15 | Hazard warning switch<br>(See 09-18-15 HAZARD WARNING SWITCH REMOVAL/INSTALLATION.)<br>(See 09-18-15 HAZARD WARNING SWITCH INSPECTION.) |
| 16 | Auto light sensor<br>(See 09-18-19 AUTO LIGHT SENSOR REMOVAL/INSTALLATION.) |
| 17 | Light switch<br>(See 09-18-13 LIGHT SWITCH REMOVAL/INSTALLATION.)<br>(See 09-18-14 LIGHT SWITCH INSPECTION.)<br>(See 09-18-15 FRONT FOG LIGHT SWITCH INSPECTION.) |
| 18 | Combination switch<br>(See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)<br>(See 09-18-13 COMBINATION SWITCH DISASSEMBLY/ASSEMBLY.) |

## DISCHARGE HEADLIGHT SERVICE WARNINGS

id091800804900

### DISCHARGE HEADLIGHT BULB SERVICE WARNINGS

- **To prevent electrical shock when replacing the discharge headlight bulb, dry hands thoroughly, and perform the work in an area out of rain.**
- **When the light switch is on, approx. 25,000 V of high voltage passes through the discharge headlight bulb socket. Because of the danger of electrical shock, do not insert fingers or a tester.**
- **When the headlights are on, high voltage flows around the socket and bulb. When turning on the discharge headlights while working, always leave the headlights in the vehicle-installed condition to prevent electrical shock.**

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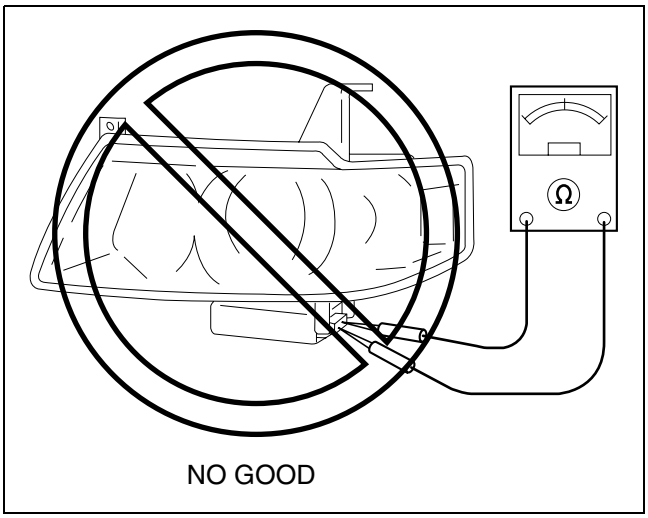
### DISCHARGE HEADLIGHT CONTROL MODULE SERVICE WARNINGS

- **Because of the danger of electrical shock, when inspecting with a tester, do not inspect the discharge headlight control module as a single unit or disassemble it.**

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### DISCHARGE HEADLIGHT CONTROL MODULE REUSE

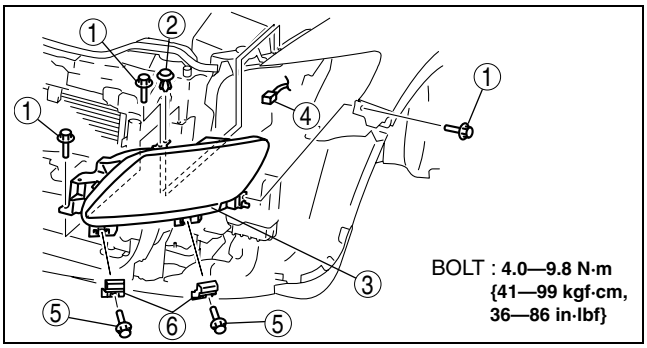
- **If the discharge headlight control module is dented or damaged in any way, replace the module with a new one to prevent electrical shock and improper operation.**
- **Although the control module may temporarily operate normally even though it has received an impact, it is possible that the interior may have been damaged. When reusing the control module, inspect the following items regarding discharge headlight illumination to verify that there are no malfunctions.**
  - **— Verify that the discharge headlights illuminate normally by testing them several times under cold illumination (headlights off for approx. 10 min or more and then turned on) and hot illumination (headlights on for approx. 15 min or more, turned off for approx. 1 min, and then turned on again) conditions.**
  - **— Inspect the headlight illumination in the period from directly after cold illumination until they are uniformly illuminated (approx. 5 min) and verify that there is no flickering or inconsistent brightness.**
  - **— Turn on the headlights for approx. 30 min with normal condition bulbs and verify that there is no brightness difference between the right and left, and that illumination is consistent.**

## FRONT COMBINATION LIGHT REMOVAL/INSTALLATION

id091800800700

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt A |
| 2 | Fastener |
| 3 | Front combination light |
| 4 | Connector |
| 5 | Bolt B |
| 6 | Brcket |

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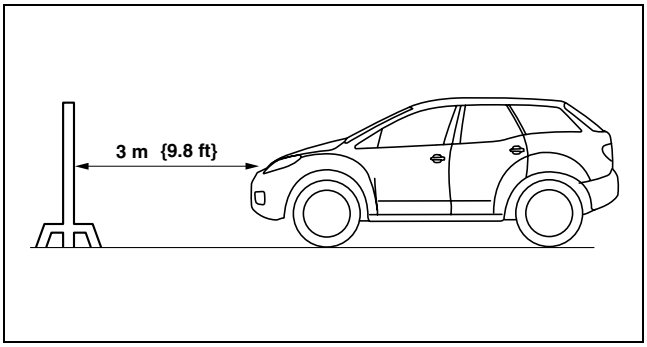
4. Install in the reverse order of removal.
5. Adjust the headlight aiming. (See09-18-5 HEADLIGHT AIMING)

## HEADLIGHT AIMING

id091800800400

1. Adjust the tire pressure to the specification.
2. Position the unloaded vehicle on a flat, level surface.
3. Seat one person in the driver's seat.
4. Position the vehicle straight ahead and perpendicular to the white screen.
5. Set the headlights **3 m {9.8 ft}** from the white screen.
6. Place an object in front of the headlight not being adjusted to block its light beam.
7. Start the engine so that the battery remains charged.
8. Turn on the low-beam headlight.
9. Set the headlight leveling switch to the 0 position. (Vehicles with headlight leveling switch)

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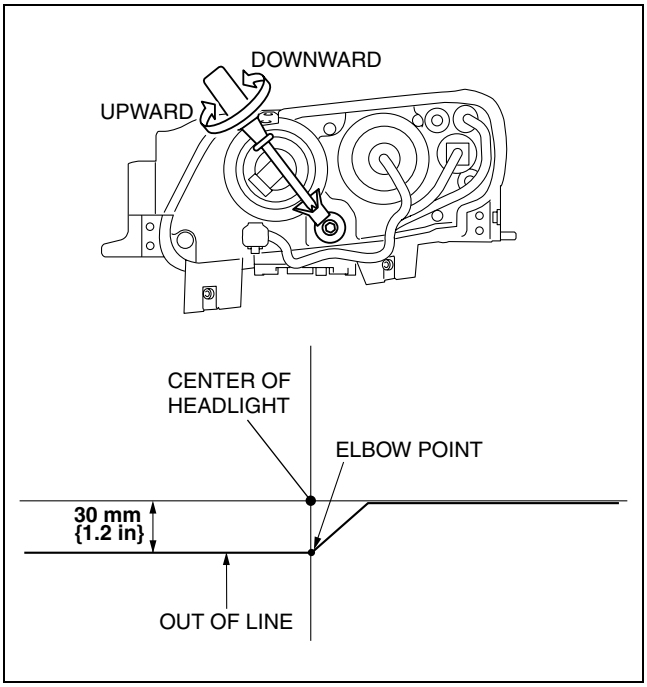
10. Adjust by turning the aiming adjustment screw so that elbow point is in the position shown in the figure.

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## HEADLIGHT BULB REMOVAL/INSTALLATION

id091800800500

**Low-beam**

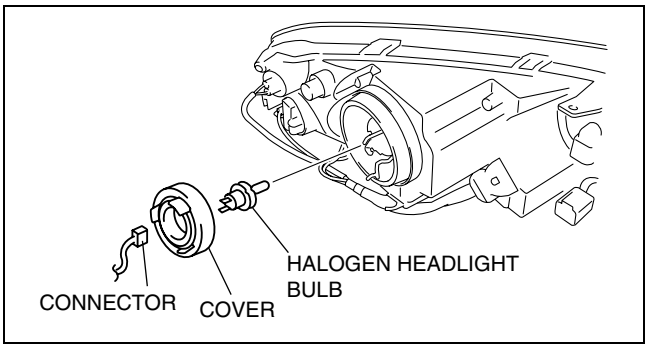
**Halogen type**

1. Disconnect the negative battery cable.
2. Remove the fasteners and slightly bend back the mudguard.
3. Disconnect the connector.

**Caution**

- **A halogen bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

4. Remove the cover.
5. Remove the socket, then remove the headlight bulb.
6. Install in the reverse order of removal.

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**Discharge type**

**Warning**

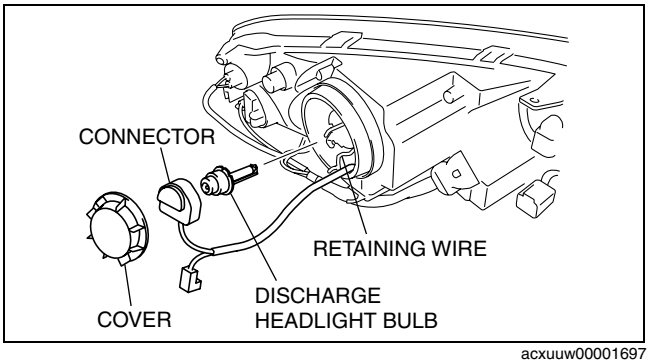
- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-4 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

1. Disconnect the negative battery cable.
2. Remove the fasteners and slightly bend back the mudguard.
3. Remove the cover.

**Caution**

- **The bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

4. Remove the connector, then remove the discharge headlight bulb.
5. Install in the reverse order of removal.

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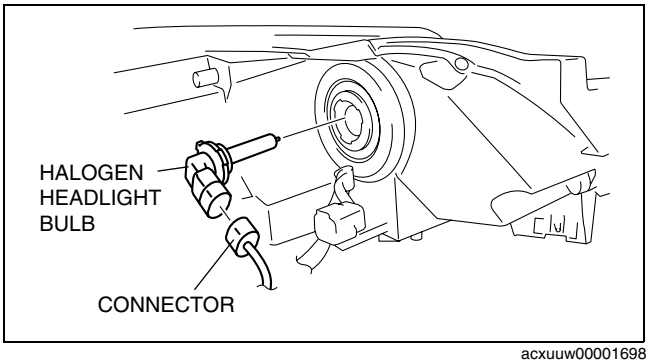
**High-beam**

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove the front combination light. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
4. Disconnect the connector.

**Caution**

- **A halogen bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When replacing the bulb, hold the metal flange, not the glass.**

5. Remove the socket, then remove the headlight bulb.
6. Install in the reverse order of removal.

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## DISCHARGE HEADLIGHT CONTROL MODULE REMOVAL/INSTALLATION

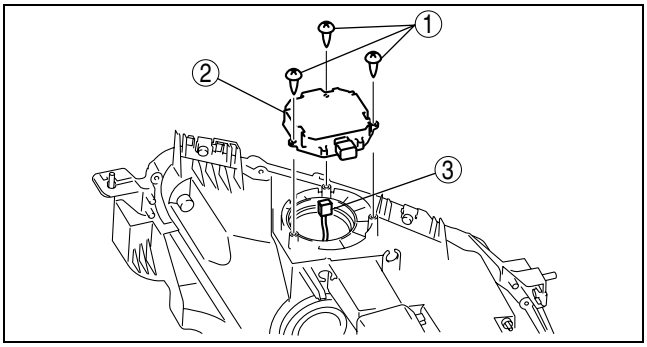
id091800805300

**Warning**

- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-4 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

1. Disconnect the negative battery cable.
2. Remove the front bumper. (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
3. Remove the front combination light. (See 09-18-5 FRONT COMBINATION LIGHT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Discharge headlight control module |
| 3 | Connector |

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5. Install in the reverse order of removal.

## DISCHARGE HEADLIGHT SYSTEM INSPECTION

id091800805400

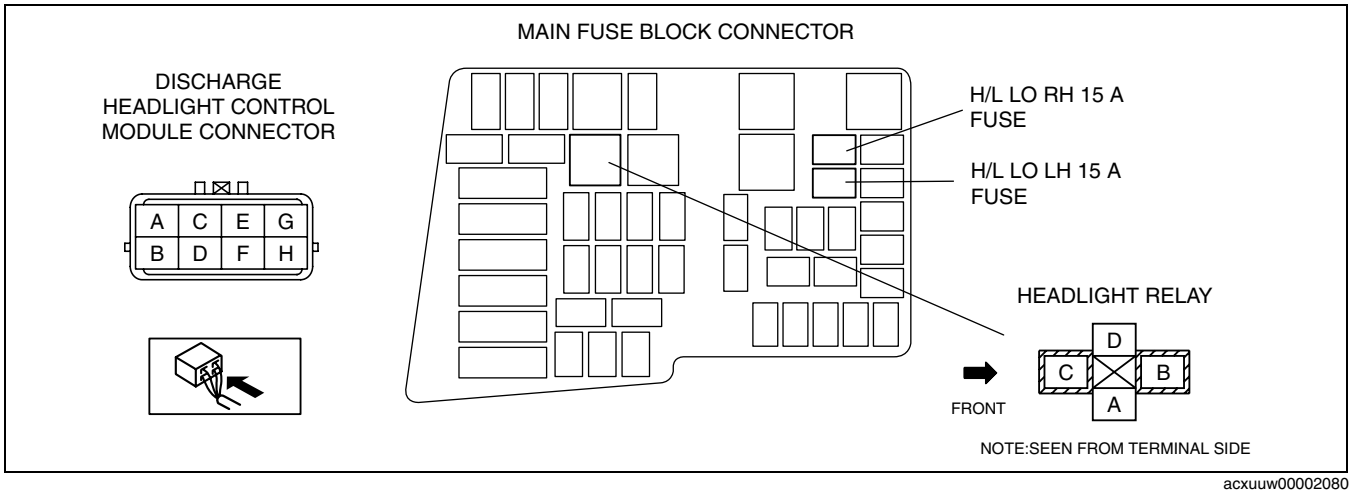
### Discharge headlight inoperative

**Warning**

- **Incorrect servicing of the discharge headlights could result in electrical shock. Before servicing the discharge headlights, always refer to the discharge headlight service warnings. (See 09-18-4 DISCHARGE HEADLIGHT SERVICE WARNINGS.)**

09-18

### Terminal layout

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### Inspection procedure

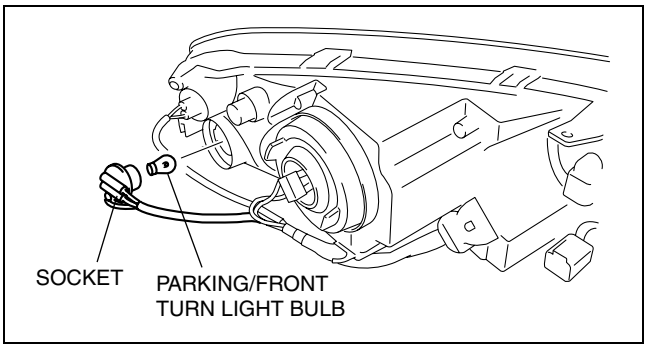
| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 1 | **INSPECT POWER SUPPLY CIRCUIT OF DISCHARGE HEADLIGHT CONTROL MODULE**<br>• Disconnect the discharge headlight control module connector.<br>• Turn the headlight switch to the HEADLIGHT (LO) position.<br>• Measure the voltage at discharge headlight control module terminal A (wiring harness-side).<br>• Is the voltage **approx. 12 V**? | Yes | Go to Step 6. |
| | | No | Go to the next step. |

| STEP | INSPECTION | | ACTION |
|---|---|---|---|
| 2 | **INSPECT FUSE**<br>• Turn the headlight switch to the OFF position.<br>• Remove the H/L LO RH 15 A fuse or H/L LO LH 15 A fuse.<br>• Inspect the fuses.<br>• Are the fuses normal? | Yes | Go to the next step. |
| | | No | Replace the fuse. |
| 3 | **INSPECT HEADLIGHT RELAY**<br>• Inspect the headlight relay. (See 09-21-4 RELAY INSPECTION.)<br>• Is the headlight relay normal? | Yes | Go to the next step. |
| | | No | Replace the headlight relay. |
| 4 | **INSPECT LIGHT SWITCH**<br>• Inspect the light switch. (See 09-18-14 LIGHT SWITCH INSPECTION.)<br>• Is the light switch normal? | Yes | Go to the next step. |
| | | No | Replace the light switch. (See 09-18-13 LIGHT SWITCH REMOVAL/INSTALLATION.) |
| 5 | **INSPECT WIRING HARNESS BETWEEN BATTERY AND DISCHARGE HEADLIGHT CONTROL MODULE**<br>• Disconnect the negative battery cable.<br>• Inspect for continuity between the following terminals:<br>— Battery (positive terminal) and headlight relay terminal C.<br>— H/L LO RH 15 A fuse and discharge headlight control module terminal A<br>— H/L LO LH 15 A fuse and discharge headlight control module terminal A<br>• Are the wiring harnesses normal? | Yes | Go to the next step. |
| | | No | Replace the related wiring harness. |
| 6 | **INSPECT WIRING HARNESS BETWEEN DISCHARGE HEADLIGHT CONTROL MODULE AND GROUND**<br>• Inspect the wiring harness between discharge headlight control module terminal B and ground for the following:<br>— Short to power supply<br>— Open circuit<br>• Is the wiring harness normal? | Yes | Go to the next step. |
| | | No | Replace the related wiring harness. |
| 7 | **VERIFY WHETHER MALFUNCTION IS IN DISCHARGE HEADLIGHT BULB OR DISCHARGE HEADLIGHT CONTROL MODULE**<br>• Install the discharge headlight low bulb (previously verified as illuminating normally). (See 09-18-6 HEADLIGHT BULB REMOVAL/INSTALLATION.)<br>• Connect the discharge headlight control module connector.<br>• Turn the headlight switch to the HEADLIGHT (LO) position.<br>• Does the headlight (low-beam) illuminate? | Yes | System inspection completed. |
| | | No | Replace the discharge headlight control module. (See 09-18-7 DISCHARGE HEADLIGHT CONTROL MODULE REMOVAL/INSTALLATION.) |

### PARKING/FRONT TURN LIGHT BULB REMOVAL/INSTALLATION

id091800804400

1. Disconnect the negative battery cable.
2. Remove the fasteners and slightly bend back the mudguard.
3. Remove the socket, then remove the parking/front turn light bulb.
4. Install in the reverse order of removal.

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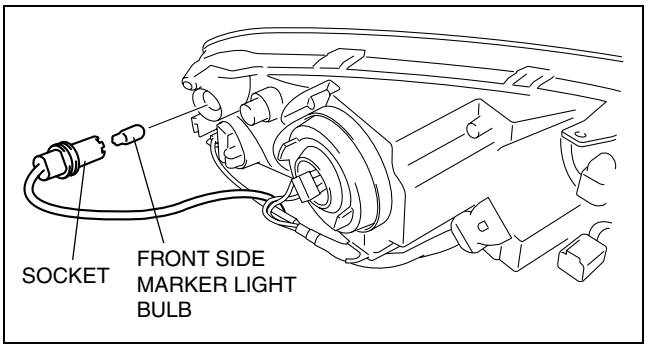
### FRONT SIDE MARKER LIGHT BULB REMOVAL/INSTALLATION

id091800807000

1. Disconnect the negative battery cable.
2. Remove the fasteners and slightly bend back the mudguard.
3. Remove the socket, then remove the front side marker light bulb.
4. Install in the reverse order of removal.

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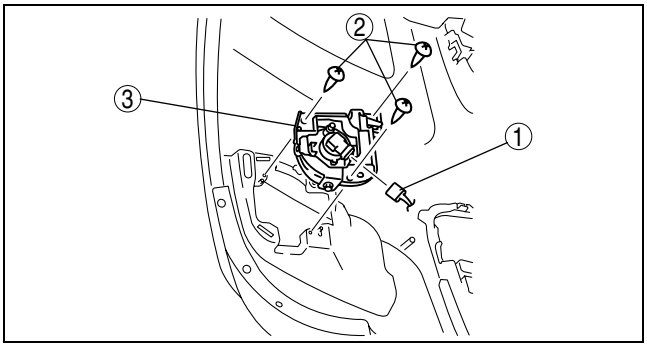
### FRONT FOG LIGHT REMOVAL/INSTALLATION

id091800802100

1. Disconnect the negative battery cable.
2. Slightly bend back the mudguard.
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Front fog light connector |
| 2 | Screw |
| 3 | Front fog light |

4. Install in the reverse order of removal.
5. Adjust the front fog light aiming. (See 09-18-9 FRONT FOG LIGHT AIMING.)

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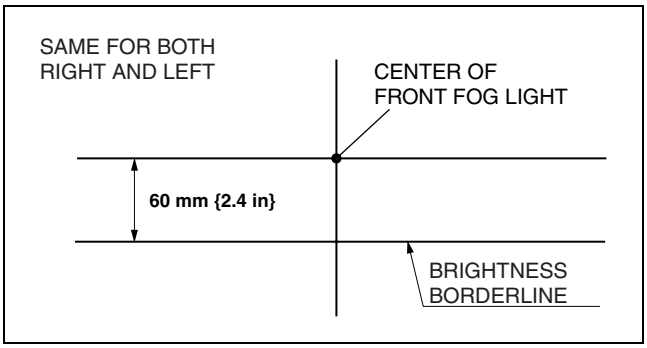
### FRONT FOG LIGHT AIMING

id091800802200

1. Make a front fog light adjustment screen as shown in the figure using double-weight, white paper.

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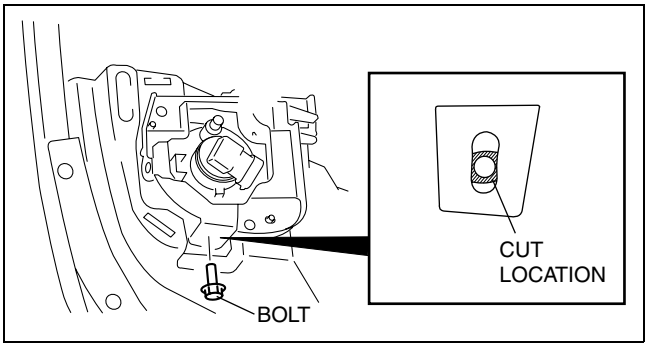
2. Remove the bolt and cut the plastic piece off at the position shaded shown in the figure.
3. Adjust the tire pressure to the specification.
4. Position the unloaded vehicle on a flat, level surface.
5. Seat one person in the driver's seat.

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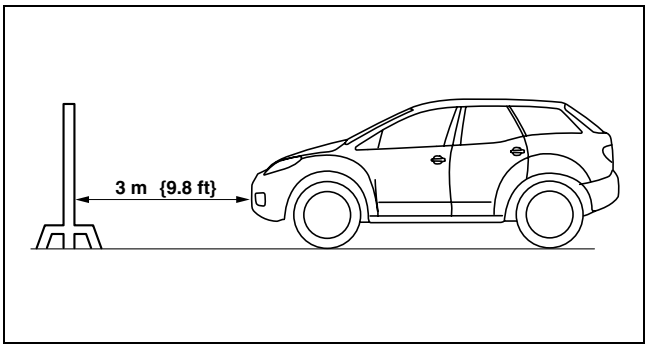
6. Line up the headlights with the white screen at a distance of **3 m {9.8 ft}** apart.
7. Place an object in front of the fog light not being adjusted to block its light beam.
8. Start the engine so that the battery remains charged.
9. Turn the front fog lights on.

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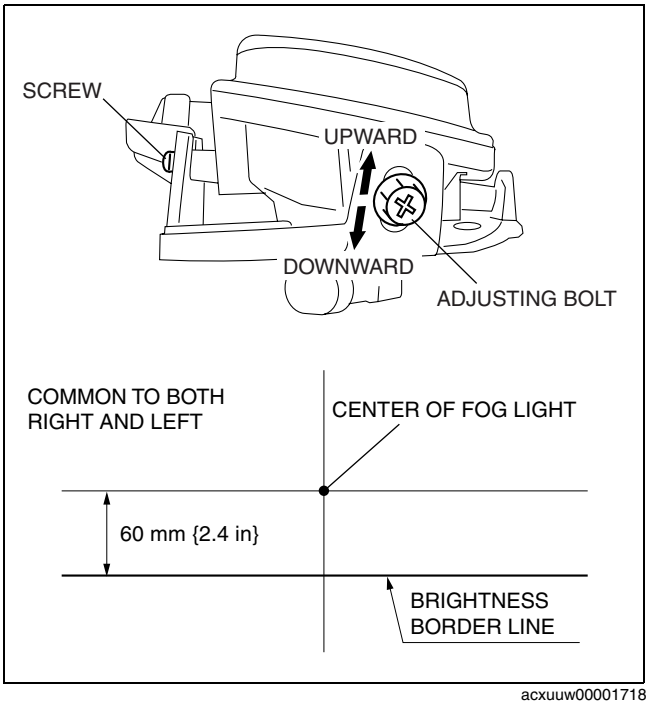
10. Loosen the screw, move the front fog light in the direction of the arrows, and adjust the center of the front fog light to the position shown in the figure.
11. Install the bolt and tighten the screw.

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## FRONT FOG LIGHT BULB REMOVAL/INSTALLATION

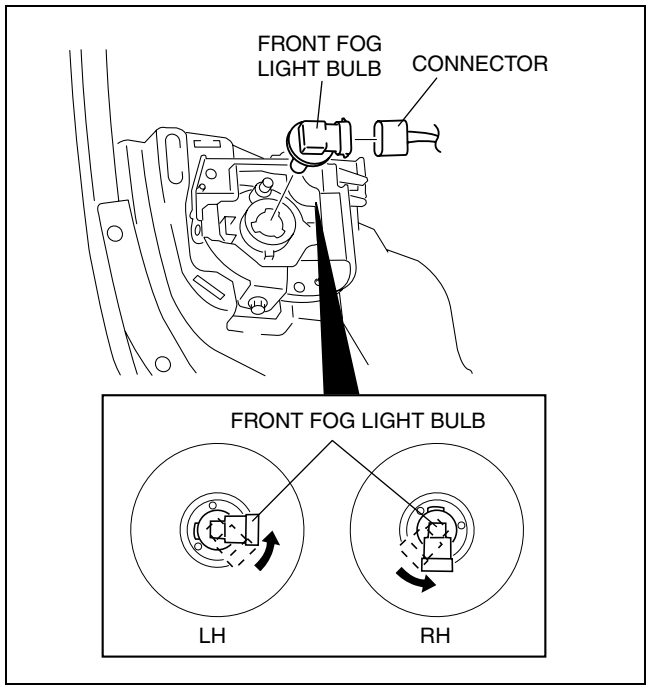
id091800802300

1. Disconnect the negative battery cable.
2. Slightly bend back the mudguard.
3. Disconnect the front fog light bulb connector and remove the front fog light bulb by turning it in the direction of the arrow.

**Caution**

- **A halogen bulb generates extremely high heat when it is illuminated. If the surface of the bulb is soiled, excessive heat will build up and the life of the bulb will be shortened. When handling the bulb, hold the flange, not the glass.**

4. Install in the reverse order of removal.

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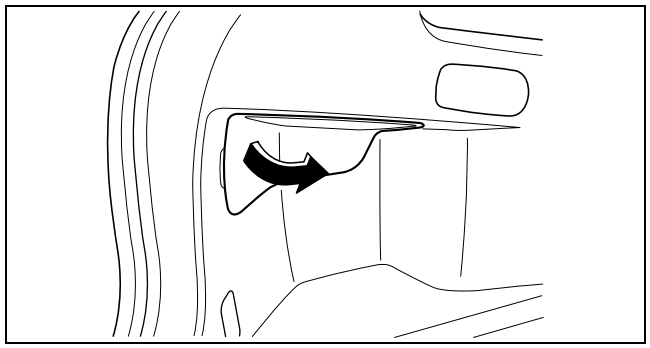
## REAR COMBINATION LIGHT REMOVAL/INSTALLATION

id091800801000

1. Disconnect the negative battery cable.
2. Remove the service hole cover.



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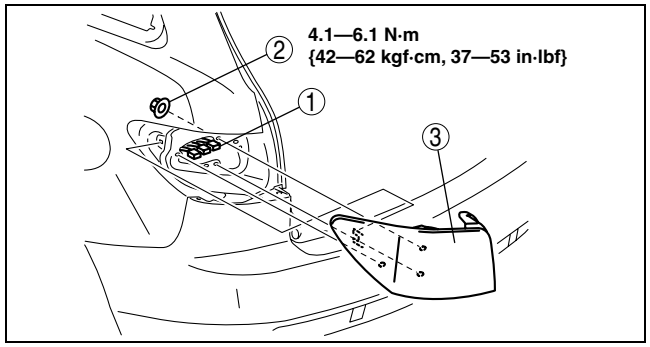
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Nut |
| 3 | Rear combination light |

4. Install in the reverse order of removal.

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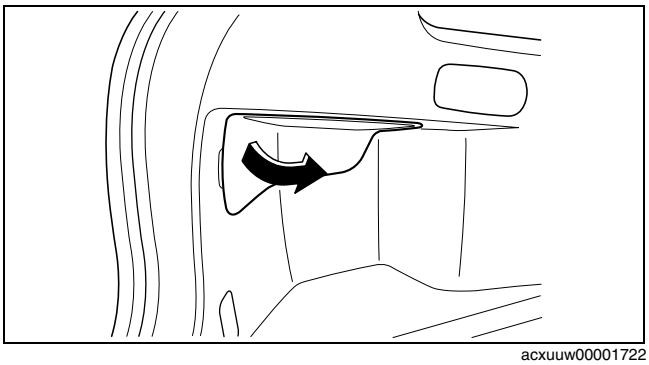
## REAR COMBINATION LIGHT BULB REMOVAL/INSTALLATION

id091800805900

1. Disconnect the negative battery cable.
2. Remove the service hole cover.



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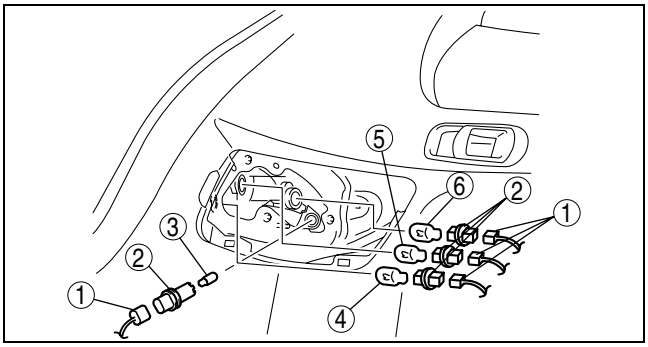
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Socket |
| 3 | Rear side marker light bulb |
| 4 | Back-up light bulb |
| 5 | Rear turn light bulb |
| 6 | Brake light/taillight bulb |

4. Install in the reverse order of removal.

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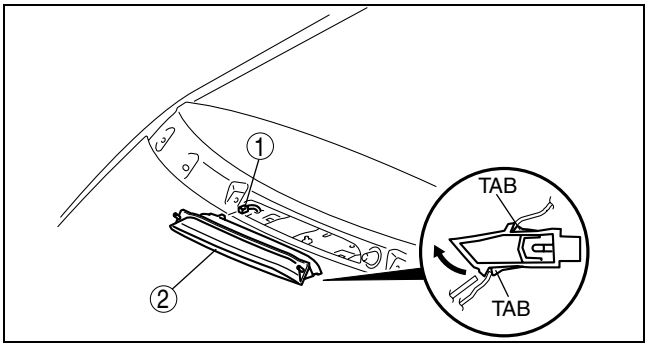
## HIGH-MOUNT BRAKE LIGHT REMOVAL/INSTALLATION

id091800802000

1. Disconnect the negative battery cable.
2. Remove the cover in the interior of the liftgate.
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | High-mount brake light |

4. Install in the reverse order of removal.

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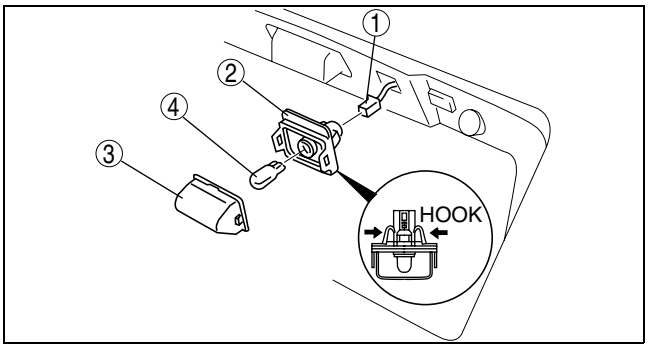
## LICENSE PLATE LIGHT REMOVAL/INSTALLATION

id091800801100

1. Disconnect the negative battery cable.
2. Remove the rear finisher.(See09-16-3 REAR FINISHER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | License plate light |
| 3 | Lens |
| 4 | License plate light bulb |

4. Install in the reverse order of removal.

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## COMBINATION SWITCH REMOVAL/INSTALLATION

id091800802500

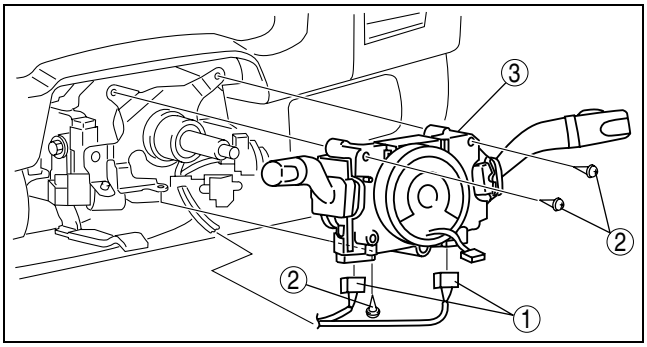
**Warning**

- **If the negative battery cable or the steering angle sensor connector is disconnected, the stored initial position of the steering angle sensor will be cleared and the DSC will not operate properly, making the vehicle unsafe to drive. Perform the steering angle sensor initialization procedure after connecting the negative battery cable.**

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (2) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (3) Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Screw |
| 3 | Combination switch |

4. Disconnect the steering angle sensor connector.
5. Install in the reverse order of removal.
6. Perform the steering angle sensor reference point setting. (See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.)

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## COMBINATION SWITCH DISASSEMBLY/ASSEMBLY

id091800802600



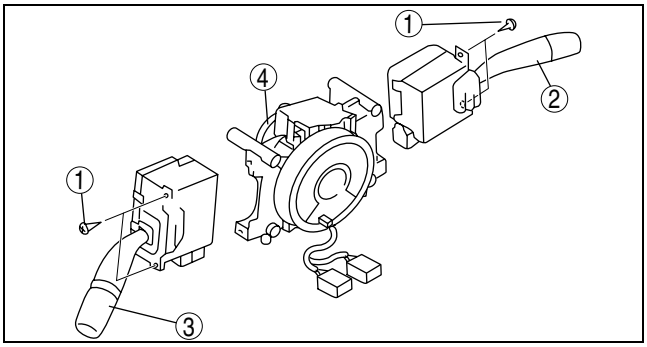
**Caution**

- **If the disc on the combination switch is deformed or has foreign material adhering to it, performance of the steering angle sensor may be reduced, causing abnormal operation. When handling the combination switch, be careful not to deform the disc and make sure there is no foreign material on it.**

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Wiper and washer switch |
| 3 | Light switch |
| 4 | Body |

2. Assemble in the reverse order of disassembly.

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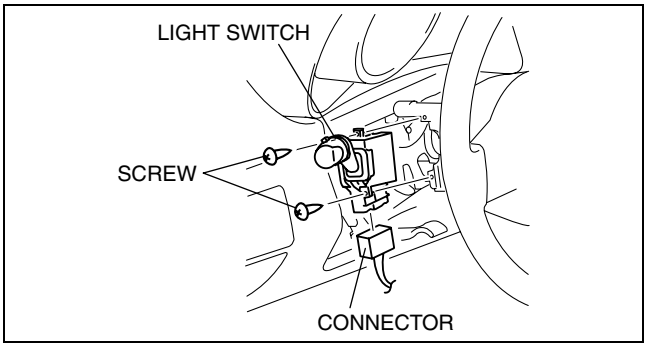
## LIGHT SWITCH REMOVAL/INSTALLATION

id091800802800

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Disconnect the light switch connector.
4. Remove the screws, then remove the light switch.
5. Install in the reverse order of removal.

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## LIGHT SWITCH INSPECTION

id091800802900

1. Verify that the continuity between the light switch terminals is as indicated in the table.
- If not as indicated in the table, replace the light switch.

**Headlight switch (Vehicle without auto light)**

○—○ : Continuity

| Switch position | | | Terminal | | | | | |
|---|---|---|---|---|---|---|---|---|
| Light | Dimmer | Flash-to-pass | J | L | P | O | Q | R |
| OFF | - | Off | | | | | | |
| | | On | | | ○ | ○ | ○ | |
| TNS | - | Off | | ○ | ○ | | | |
| | | On | | ○ | ○ | ○ | ○ | |
| Head-light | LO | Off | ○ | ○ | ○ | | | ○ |
| | | On | ○ | ○ | ○ | ○ | ○ | |
| | HI | - | ○ | ○ | ○ | ○ | | |

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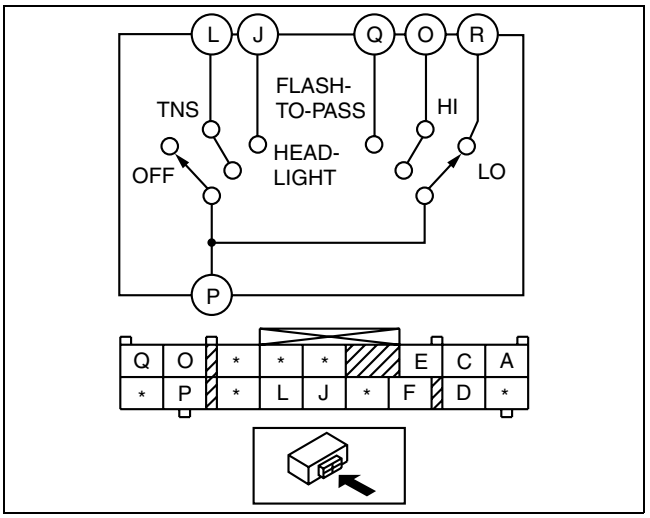


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**Headlight switch (Vehicle with auto light)**

○—○ : Continuity

| Switch position | | | Terminal | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Light | Dimmer | Flash-to-pass | J | L | P | O | Q | R | H |
| OFF | - | Off | | | | | | | |
| | | On | | | ○ | ○ | ○ | | |
| TNS | - | Off | | ○ | ○ | | | | |
| | | On | | ○ | ○ | ○ | ○ | | |
| Head-light | LO | Off | ○ | ○ | ○ | | | ○ | |
| | | On | ○ | ○ | ○ | ○ | ○ | | |
| | HI | - | ○ | ○ | ○ | ○ | | | |
| Auto | LO | Off | | | ○ | | | ○ | ○ |
| | | On | | | ○ | ○ | ○ | | ○ |
| | HI | - | | | ○ | ○ | | | ○ |

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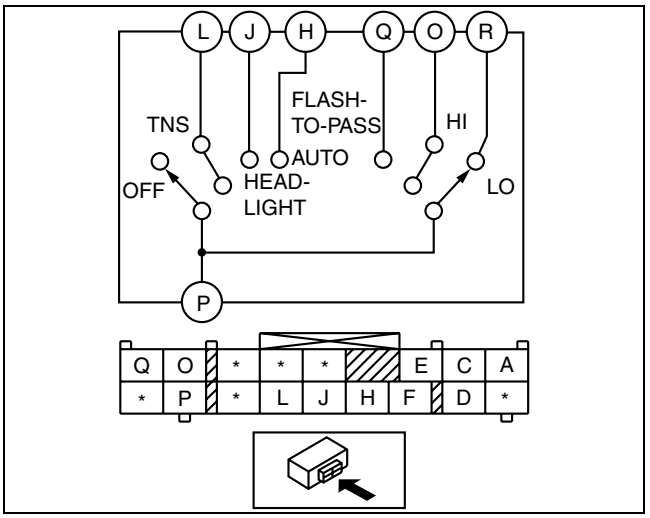


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**Turn Switch**

○—○ : Continuity

| Switch position | Terminal | | |
|---|---|---|---|
| | C | A | E |
| Left | ○ | ○ | |
| Off | | | |
| Right | ○ | | ○ |

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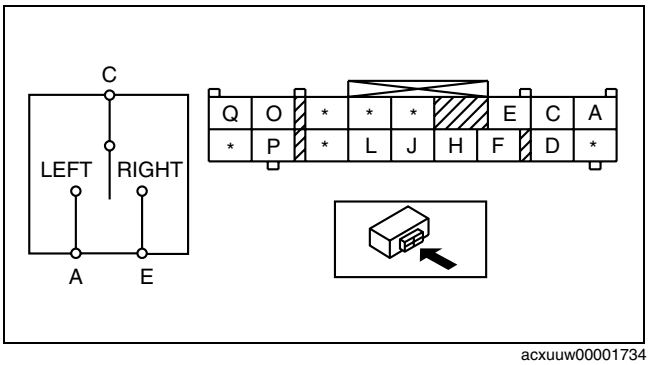


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## FRONT FOG LIGHT SWITCH INSPECTION

id091800803200

1. Verify that the continuity between the front fog light switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the light switch.

○—○ : Continuity

| Switch position | | Terminal | |
|---|---|---|---|
| Light | Front fog light switch | D | P |
| OFF | OFF | | |
| | ON | ○—— | ——○ |
| TNS | ON | ○—— | ——○ |
| Head light | ON | ○—— | ——○ |
| Auto | ON | ○—— | ——○ |

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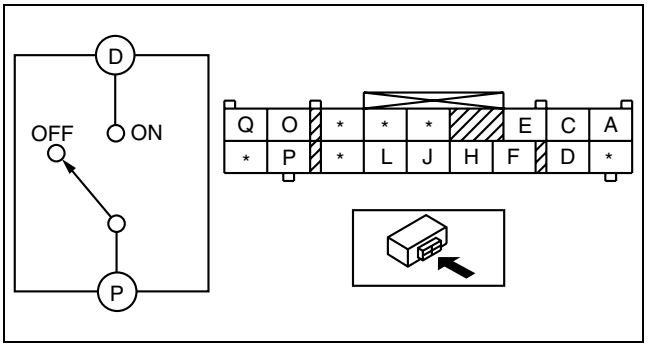


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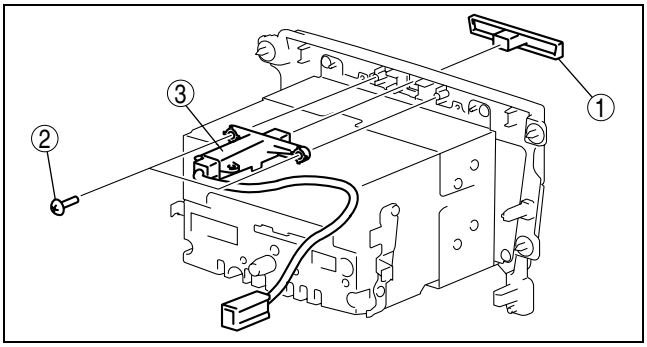
## HAZARD WARNING SWITCH REMOVAL/INSTALLATION

id091800803000

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Hazard warning switch panel |
| 2 | Screw |
| 3 | Hazard warning switch |

4. Install in the reverse order of removal.

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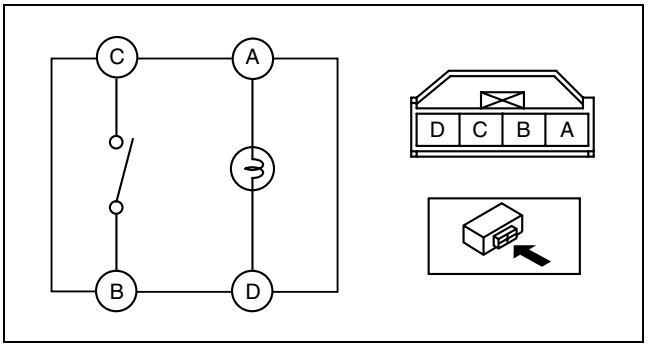
## HAZARD WARNING SWITCH INSPECTION

id091800803100

1. Verify that the continuity between the hazard warning switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the hazard warning switch.

○—○ : Continuity ○—⓪—○ : Bulb

| Switch position | Terminal | | | |
|---|---|---|---|---|
| | A | D | C | B |
| Off | ○—⓪—○ | | | |
| On | ○—⓪—○ | | ○—— | ——○ |

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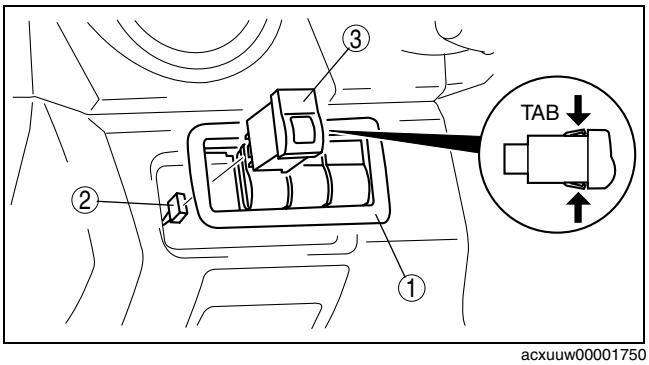
## HEADLIGHT LEVELING SWITCH REMOVAL/INSTALLATION

id091800803600

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Switch bezel component<br>(See 09-18-16 Switch Bezel Component Removal Note.) |
| 2 | Connector |
| 3 | Headlight leveling switch |

3. Install in the reverse order of removal.

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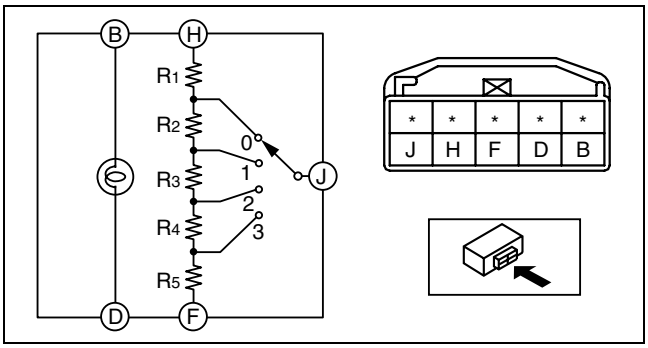
### Switch Bezel Component Removal Note

1. Access the switch bezel component from behind of the dashboard, and squeeze the tabs of the switch bezel component.
2. Remove the switch bezel component from the dashboard.

## HEADLIGHT LEVELING SWITCH INSPECTION

id091800803700

1. Verify that continuity between the headlight leveling switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the headlight leveling switch.

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: Resistance : Bulb

| Switch position | Terminal | | | | |
|---|---|---|---|---|---|
| | B | D | H | J | F |
| 0 | | | R1 | R2 R3 R4 | R5 |
| 1 | | | R1 | R2 R3 | R4 R5 |
| 2 | | | R1 R2 | R3 R4 | R5 |
| 3 | | | R1 R2 R3 R4 | | R5 |

R1 : 715 ohms R2 : 715 ohms R3 : 261 ohms
R4 : 604 ohms R5 : 715 ohms

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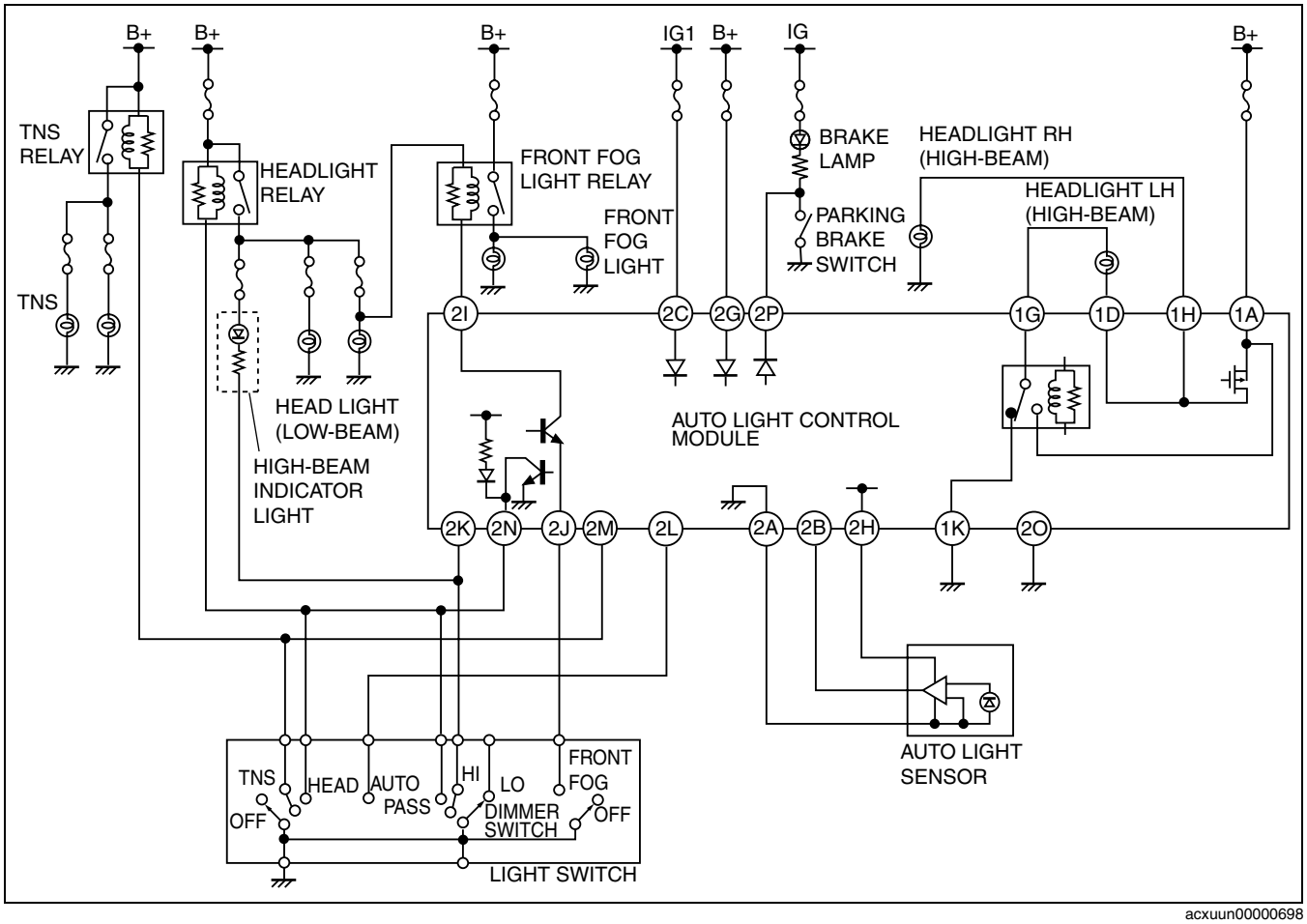
## DRL AND AUTO LIGHT SYSTEM WIRING DIAGRAM

id091800807100

### With DRL

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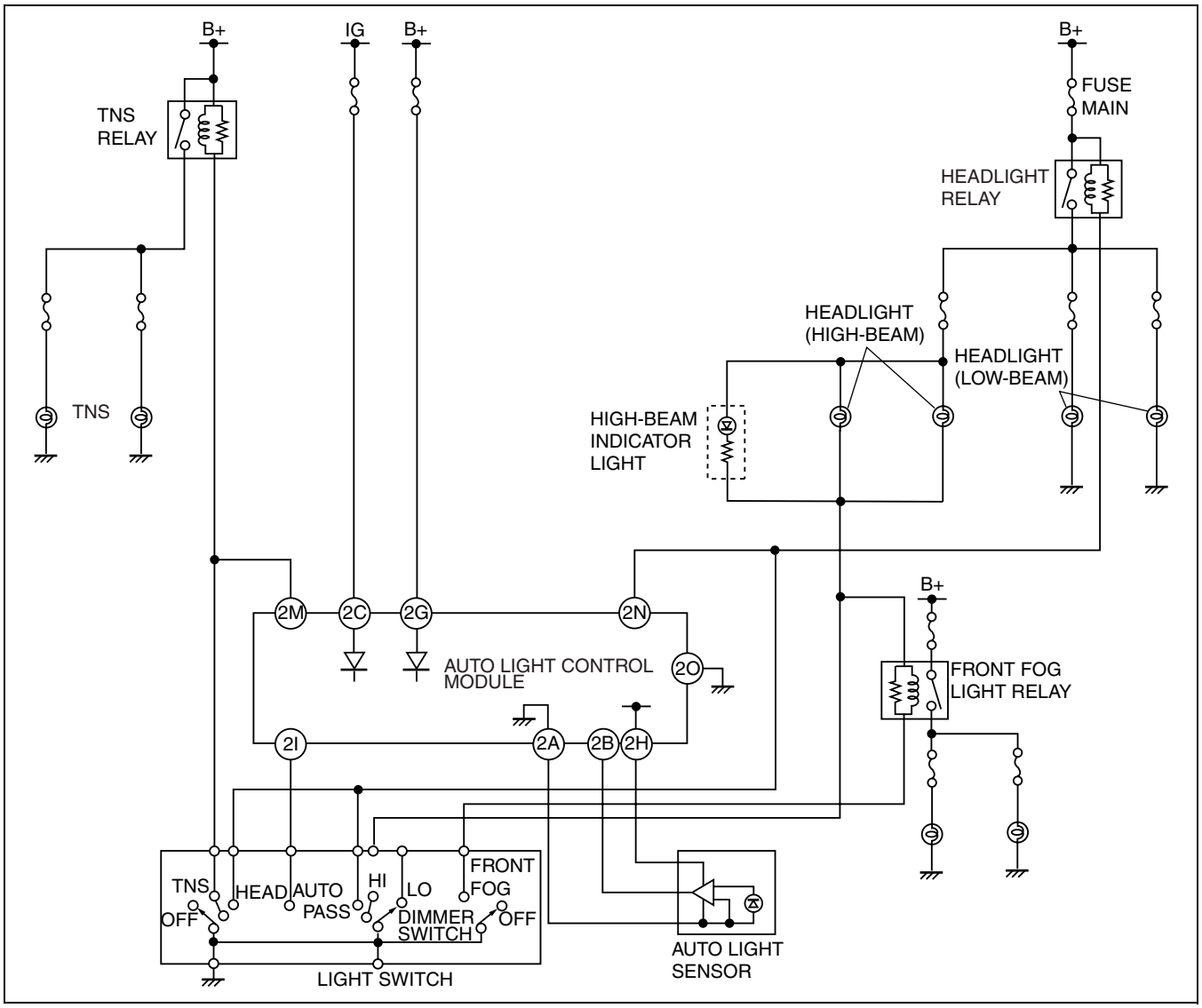
**Without DRL**

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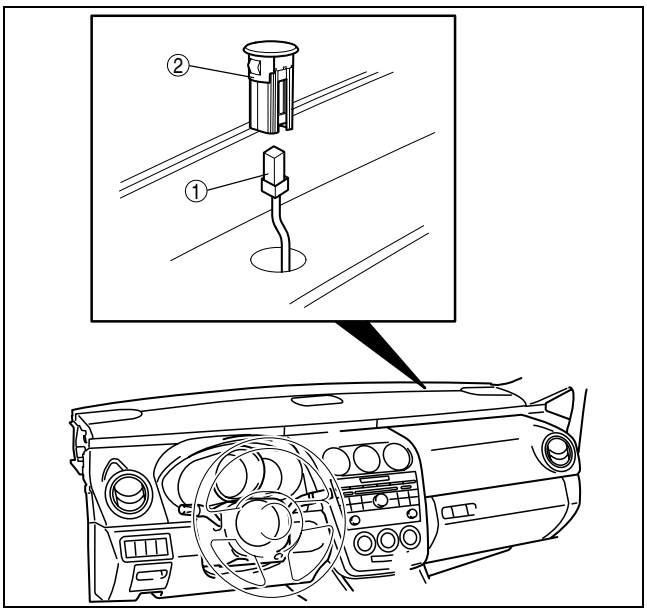
## AUTO LIGHT SENSOR REMOVAL/INSTALLATION

id091800807200

1. Disconnect the negative battery cable.
2. Remove the dashboard under cover (RH).
3. Push out the auto light sensor with connector from under the instrument panel.
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Auto light sensor |

5. Install in the reverse order of removal.

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## AUTO LIGHT SENSOR INSPECTION

id091800807600

**Note**
- Inspect the auto light sensor from the back side of the connector with the connector still connected.

1. Measure the voltage at auto light sensor terminal A and verify that the voltage is **5 V**.
2. Shine a fluorescent light or expose the auto light sensor to natural sunlight.
3. Connect the positive (+) lead to terminal B and the negative (–) lead to terminal C of the auto light sensor, and verify that the voltages are as shown in the table.
   - If the voltage is not as specified, replace the auto light sensor.

○—○: Continuity

| Test condition | Voltage (V) |
|---|---|
| Sensor subject to fluorescent light or natural sunlight | 0.21—4.65 |
| Sensor covered by a cloth | 0.20 or less |

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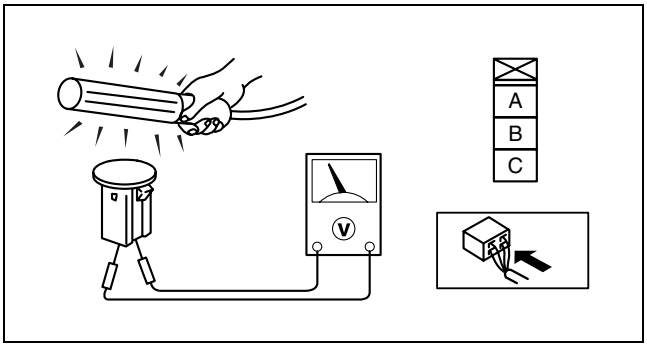


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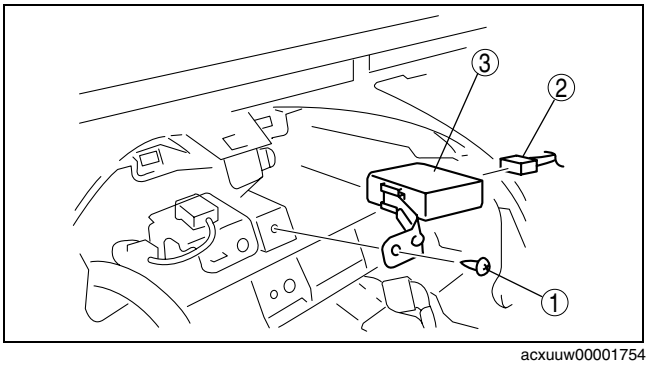
## AUTO LIGHT CONTROL MODULE REMOVAL/INSTALLATION

id091800807300

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
3. Remove the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | Auto light control module |

5. Install in the reverse order of removal.

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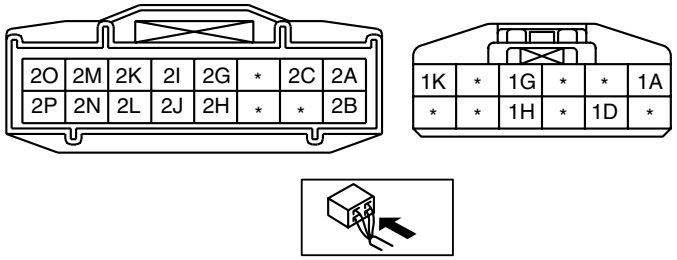
## AUTO LIGHT CONTROL MODULE INSPECTION

id091800807400

1. Measure the voltage at the auto light control module terminals as indicated below.
2. Disconnect the auto light control module connector before inspecting for continuity at terminals 1K, 2A, 2O and 2P.
   - If not as specified, inspect the parts listed under “Action.”
   - If the parts and wiring harnesses are okay but the system still does not work properly, replace the auto light control module.

### Terminal Voltage List (Reference)

AUTO LIGHT CONTROL MODULE
HARNESS SIDE CONNECTOR

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| Terminal | Signal | Connection | Test condition | | Voltage (V)/ Continuity | Action |
|---|---|---|---|---|---|---|
| 1A* | Power supply | DRL 15 A fuse | Constant | | B+ | • Inspect DRL 15 A fuse<br>• Inspect related harness |
| 1D* | Headlight (LH) operation (high-beam) | Headlight (LH) (high-beam) | Light switch at headlight position | Dimmer switch at the high-beam position | B+ | • Inspect headlight (LH)<br>• Inspect related harness |
| | | | | Dimmer switch at the low-beam position | 1.0 or less | |
| 1G* | Headlight (LH) operation (high-beam) | Headlight (LH) (high-beam) | Light switch at headlight position | Dimmer switch at the high-beam position | 1.0 or less | • Inspect headlight (LH)<br>• Inspect related harness |
| | | | DRL mode | | B+ | |
| 1H* | Headlight (RH) operation (high-beam) | Headlight (RH) (high-beam) | Light switch at headlight position | Dimmer switch at the high-beam position | B+ | • Inspect headlight (RH)<br>• Inspect related harness |
| | | | | Dimmer switch at the low-beam position | 1.0 or less | |
| 1K* | Ground | GND | Constant: check for continuity to ground | | Yes | Inspect GND |
| 2A | Ground | GND | Constant: check for continuity to ground | | Yes | Inspect GND |
| 2B | Auto light sensor input | Auto light sensor | fluorescent light shined directly on the auto light sensor | | 0.21—4.65 | • Inspect auto light sensor<br>• Inspect related harness |
| | | | Blocking light to auto light sensor | | 0.20 or less | • Inspect auto light sensor<br>• Inspect related harness |
| 2C | IG1 | METER 10 A fuse | Ignition switch at ON | | B+ | • Inspect METER 10 A fuse<br>• Inspect related harness |
| | | | Ignition switch at LOCK or ACC | | 1.0 or less | |

| Terminal | Signal | Connection | Test condition | | Voltage (V)/ Continuity | Action |
|---|---|---|---|---|---|---|
| 2G | Power supply | ROOM 15 A fuse | Constant | | B+ | • Inspect ROOM 15 A fuse<br>• Inspect related harness |
| 2H | Auto light sensor power supply | Auto light sensor | Constant | | 5 | • Inspect auto light sensor<br>• Inspect related harness |
| 2I* | Front fog light relay on/off | Front fog light relay | Light switch at headlight position and dimmer switch at LO | Front fog light switch at ON | 2.0 or less | • Inspect front fog light relay<br>• Inspect related harness |
| | | | | Front fog light switch at OFF | B+ | |
| 2J* | Front fog light switch on/off | Front fog light switch | Light switch at headlight position and dimmer switch at LO | Front fog light switch at ON | 1.0 or less | • Inspect light switch<br>• Inspect related harness |
| | | | | Front fog light switch at OFF | B+ | |
| 2K* | High-beam on/ off | Light switch | Light switch at headlight position | Dimmer switch at HI | 1.0 or less | • Inspect light switch<br>• Inspect related harness |
| | | | | Dimmer switch at LO | B+ | |
| 2L | Light switch (Auto) signal | Light switch | Ignition switch at ON | Light switch at AUTO position | 1.0 or less | • Inspect light switch<br>• Inspect related harness |
| | | | | Other | B+ | |
| 2M | TNS relay operation/TNS switch on/off | TNS relay | Ignition switch at ON and light switch at AUTO position | Parking lights turn on (Sensor voltage is **0.3 V or less**.) | 1.0 or less | • Inspect TNS 15 A fuse<br>• Inspect TNS relay<br>• Inspect related harness |
| | | | | Parking lights turn off (Sensor voltage is **2.3 V or more**.) | B+ | |
| | | Light switch | Ignition switch at ON | Light switch at TNS or headlight position | 1.0 or less | • Inspect light switch<br>• Inspect related harness |
| | | | | Light switch at OFF position | B+ | |
| 2N | Headlight relay operation/ headlight switch on/off | Headlight relay | Ignition switch at ON and light switch at AUTO position | Headlights (low-beam) turn on (Sensor voltage is **0.3 V or less**.) | 1.0 or less | • Inspect headlight relay<br>• Inspect related harness |
| | | | | Headlights (low-beam) turn off (Sensor voltage is **2.3 V or more**.) | B+ | |
| | | Light switch | Light switch at headlight position | | 1.0 or less | • Inspect light switch<br>• Inspect related harness |
| | | | Light switch at OFF or TNS position | | B+ | |
| 2O | Ground | GND | Constant: check for continuity to ground | | Yes | Inspect GND |
| 2P* | Parking brake lever depressed/ released | Parking brake switch | Parking brake lever depressed: check for continuity to ground | | Yes | • Inspect parking brake switch<br>• Inspect related harness |
| | | | Parking brake lever released: check for continuity to ground | | No | |

* : For vehicles with DRL only.

## AUTO LIGHT ILLUMINATION LEVEL SETTING

id091800803300

**Caution**
- **If any of the following occurs, the sensitivity cannot be set properly. Therefore, resume from Step 1.**
- **Each procedure and operation interval exceeds 5 s.**
- **Procedures are performed incorrectly.**

**Note**
- Perform the procedure in a condition that allows verification of the headlight illumination because it is necessary to verify the setting condition according to the number of times headlights turn on.

1. Turn the ignition switch to the ON position with the light switch in the OFF position and pulled back (Flash-to-pass ON).
2. Switch the light switch from the OFF to TNS position five times and return it to the OFF position.
3. Pull the light switch back once. (Flash-to-pass ON)
4. Turn the light switch to the TNS position.
5. Switch the light switch from the TNS to ON position five times and return it to the TNS position.
6. Turn the light switch to the ON position.
7. Switch the light switch from the ON to AUTO position five times and return it to the ON position.
8. Turn the light switch to the TNS position.

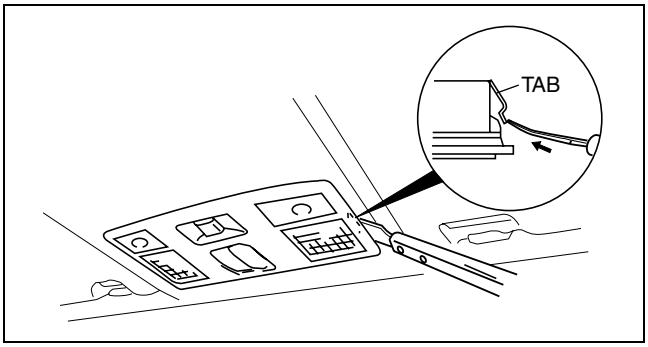
**Note**
- Switches to the sensitivity setting mode when the above operations are performed.
- The headlights turn on for the number of times according to the current setting conditions.
  - — Illumination (Two times): Standard sensitivity
  - — Illumination (Three times): Low sensitivity

9. Switch the sensitivity by pulling the light switch back (Flash-to pass ON).
10. Verify the number of times the headlights turn on and that the sensitivity is set properly.
    - Illumination (Two times): Standard sensitivity
    - Illumination (Three times): Low sensitivity

## MAP LIGHT REMOVAL/INSTALLATION

id091800801200

1. Disconnect the negative battery cable.
2. Insert a scraper into the gap between the headliner and the map light.
3. Press the tab and remove the map light.

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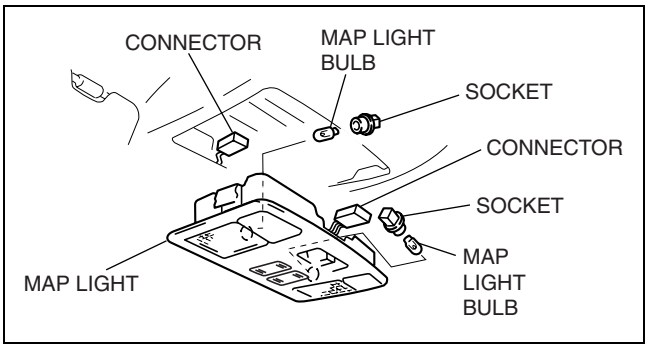
4. Disconnect the connector.
5. Remove the socket, then remove the map light bulb.
6. Install in the reverse order of removal.

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## MAP LIGHT INSPECTION

id091800801300

1. Verify that the continuity between the map light terminals is as indicated in the table.
   - If not as indicated in the table, replace the map light.

: Bulb

| Switch position | | Terminal | | |
|---|---|---|---|---|
| MAP LIGHT SWITCH | INTERIOR LIGHT SWITCH | C | B | A |
| ON | - | | ○—⊘—○ | |
| - | DOOR | ○—⊘—○ | | |
| OFF | OFF | | | |

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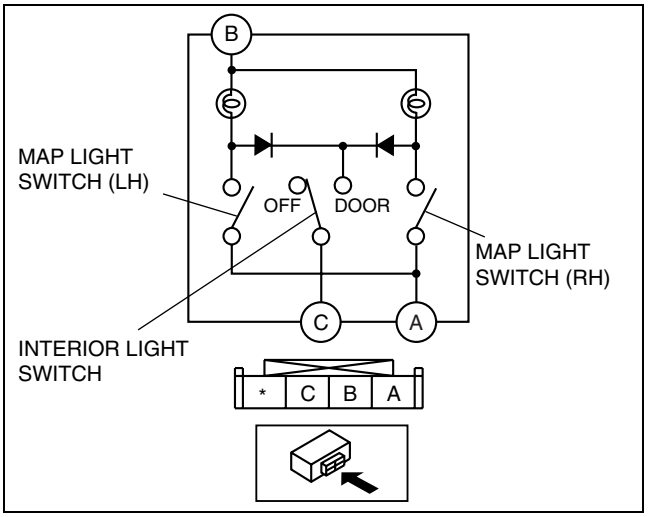


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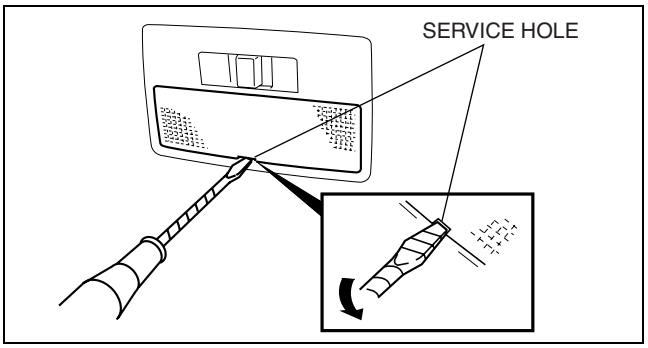
## INTERIOR LIGHT BULB REMOVAL/INSTALLATION

id091800801400

1. Disconnect the negative battery cable.
2. Insert a tape-wrapped flathead screwdriver into the service hole and pry with the screwdriver in the direction shown by the arrow to remove the lens.

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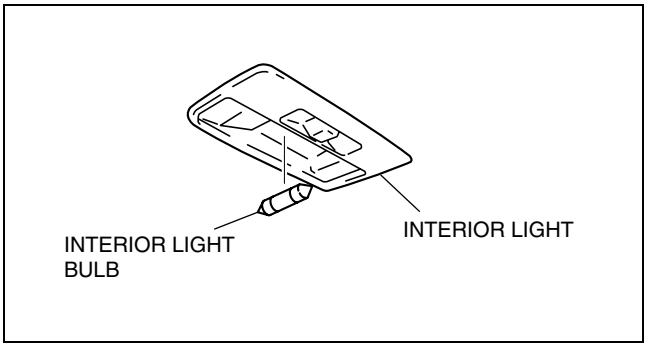
3. Remove the interior light bulb.
4. Install in the reverse order of removal.

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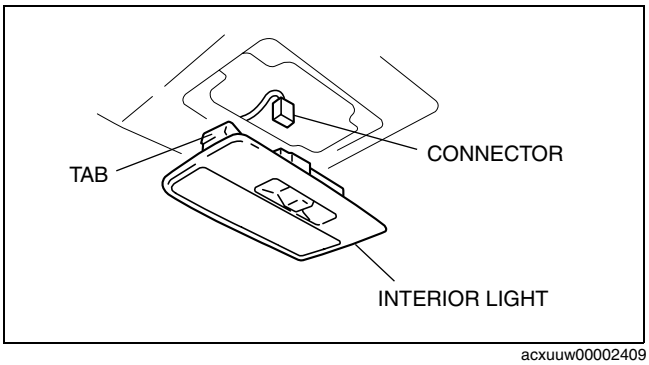
## INTERIOR LIGHT REMOVAL/INSTALLATION

id091800801500

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)

(12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
(13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
(14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
(15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
(16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
(17)Headliner (See09-17-27 HEADLINER REMOVAL/INSTALLATION.)

3. Detach the tab and remove the interior light.
4. Install in the reverse order of removal.

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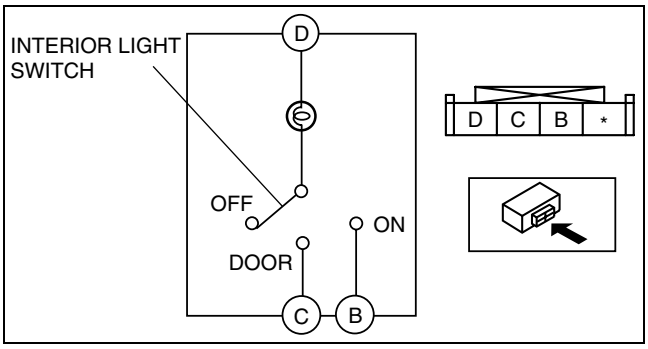
### INTERIOR LIGHT INSPECTION

id091800801600

1. Verify that the continuity between the interior light terminals is as indicated in the table.
   - If not as indicated in the table, replace the interior light.




acxuuw00001766

: Bulb

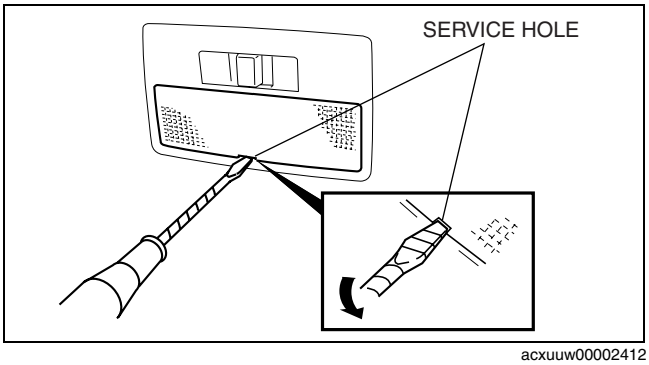
| Switch position | Terminal | | |
|---|---|---|---|
| | D | C | B |
| ON | ○ | ⊖ | ○ |
| DOOR | ○ | ⊖ | ○ |
| OFF | | | |

acxuuw00001767

### CARGO COMPARTMENT LIGHT BULB REMOVAL/INSTALLATION

id091800807800

1. Disconnect the negative battery cable.
2. Insert a tape-wrapped flathead screwdriver into the service hole and pry with the screwdriver in the direction shown by the arrow to remove the lens.

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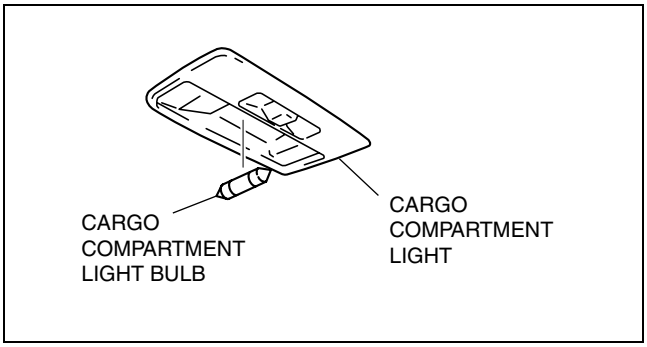
3. Remove the cargo compartment light bulb.
4. Install in the reverse order of removal.

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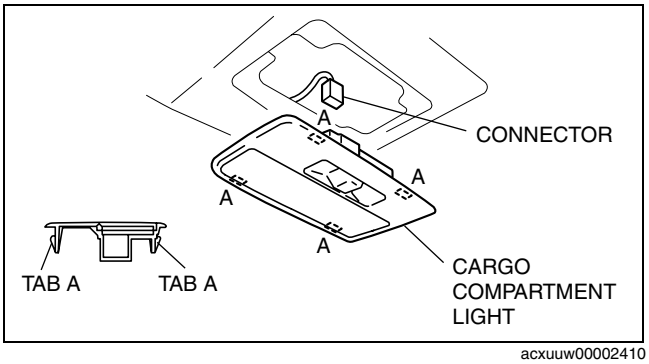
### CARGO COMPARTMENT LIGHT REMOVAL/INSTALLATION

id091800801700

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (2) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (5) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (6) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/ INSTALLATION.)
   (7) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
   (8) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (9) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (10)Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (11)Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (12)C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (13)D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (14)Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
   (15)Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
   (16)Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
   (17)Headliner (See09-17-27 HEADLINER REMOVAL/INSTALLATION.)
3. Detach the tab and remove the interior light..
4. Install in the reverse order of removal.

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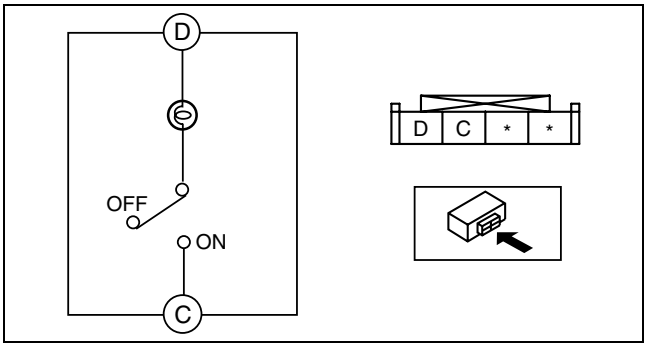
### CARGO COMPARTMENT LIGHT INSPECTION

id091800801800

1. Verify that the continuity between the cargo compartment light terminals is as indicated in the table.
   - If not as indicated in the table, replace the cargo compartment light.

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: Bulb

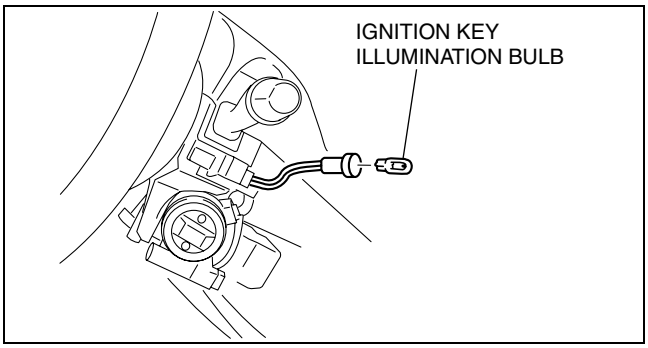
| Switch position | Terminal | |
|---|---|---|
| | C | D |
| ON | ○ | ○ |
| OFF | | |

acxuuw00002414

### IGNITION KEY ILLUMINATION BULB REMOVAL/INSTALLATION

id091800802400

1. Disconnect the negative battery cable.
2. Remove the lower column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Remove the ignition key illumination bulb.
4. Install in the reverse order of removal.

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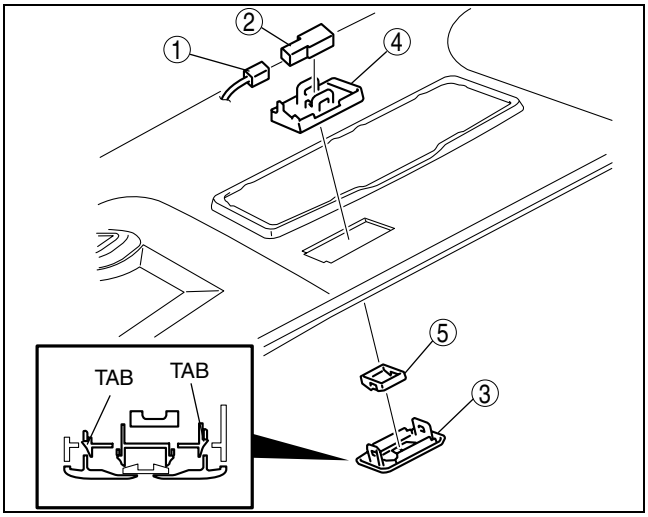
### SPOT LIGHT REMOVAL/INSTALLATION

id091800807500

1. Disconnect the negative battery cable.
2. Remove the A-pillar trim. (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
3. Remove the sunvisor. (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
4. Remove the map light. (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
5. Set the headliner out of the way.
6. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Spot light |
| 3 | Cover A |
| 4 | Cover B |
| 5 | Lens |

7. Install in the reverse order of removal.

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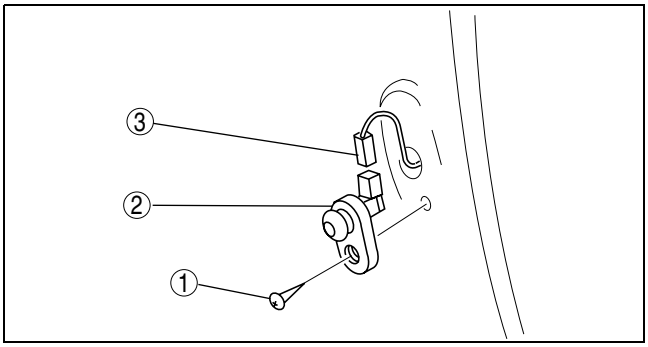
### DOOR SWITCH REMOVAL/INSTALLATION

id091800803400

1. Disconnect the negative battery cable.
2. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Door switch |
| 3 | Connector |

3. Install in the reverse order of removal.

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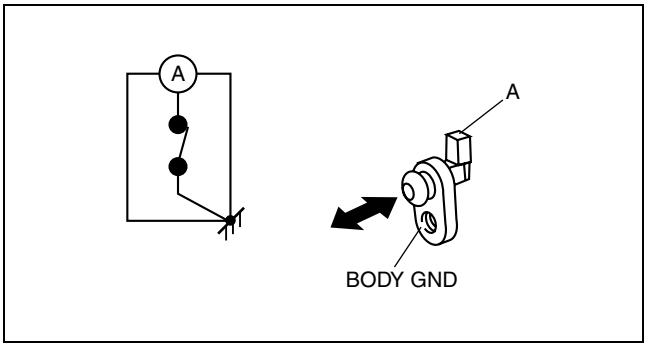
## DOOR SWITCH INSPECTION

id091800803500

1. Verify that the continuity between door switch terminal and the body ground is as indicated in the table.
   - If not as indicated in the table, replace the door switch.




DPE918ZW1064

○——○ : Continuity

| Switch position | Terminal | |
|---|---|---|
| | A | Body GND |
| Pressed | | |
| Released | ○ | ○ |

DPE918ZW1065

# 09-19 WIPER/WASHER SYSTEM

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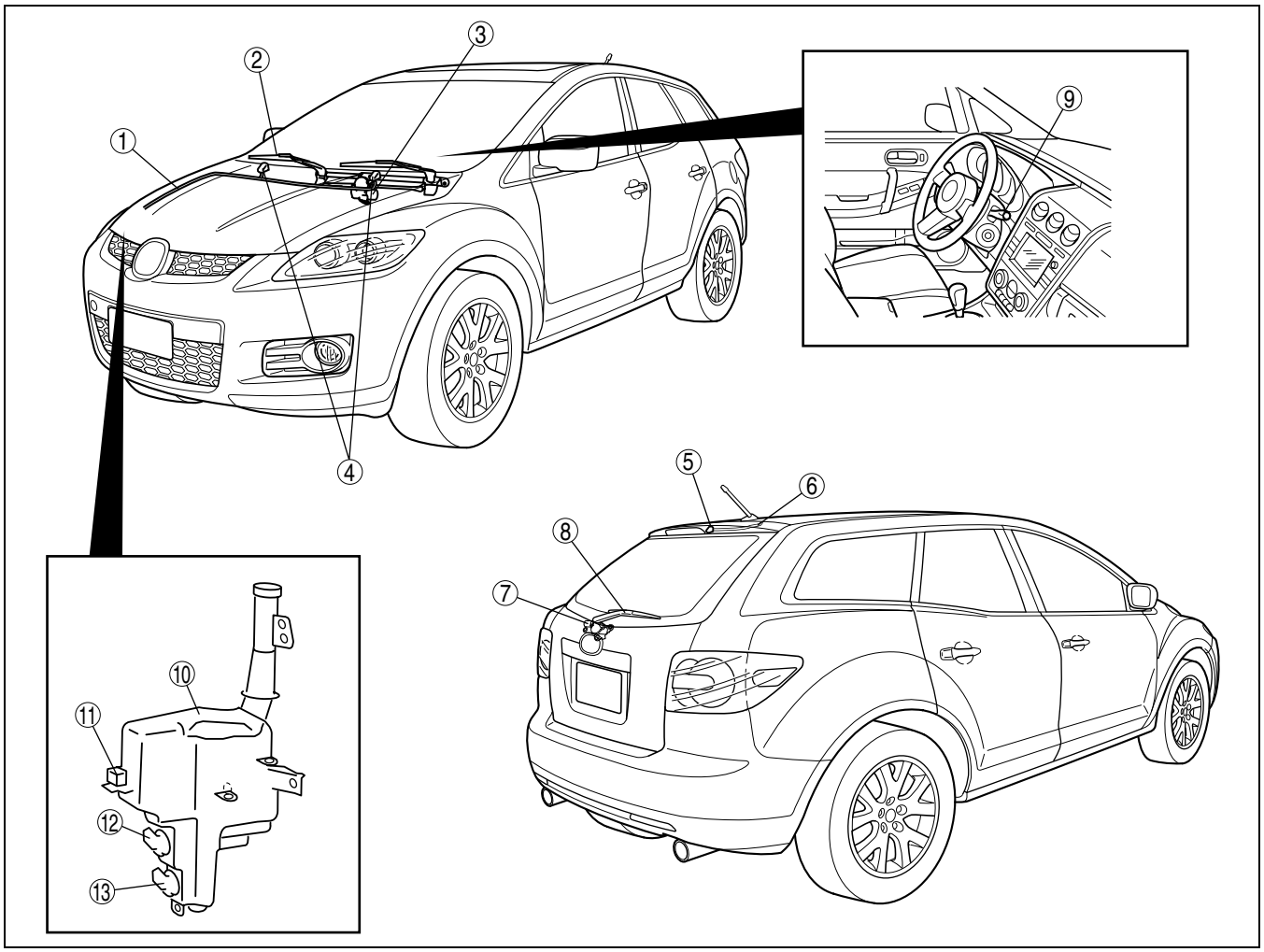
## WIPER/WASHER SYSTEM LOCATION INDEX

id091900800100

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| | |
|---|---|
| 1 | Windshield washer hose<br>(See 09-19-7 WINDSHIELD WASHER HOSE REMOVAL/INSTALLATION.) |
| 2 | Windshield wiper arm and blade<br>(See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)<br>(See 09-19-4 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.) |
| 3 | Windshield wiper motor<br>(See 09-19-4 WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION.)<br>(See 09-19-5 WINDSHIELD WIPER MOTOR INSPECTION.) |
| 4 | Windshield washer nozzle<br>(See 09-19-6 WINDSHIELD WASHER NOZZLE REMOVAL/INSTALLATION.) |
| 5 | Rear washer nozzle<br>(See 09-19-11 REAR WASHER NOZZLE REMOVAL/INSTALLATION.)<br>(See 09-19-12 REAR WASHER NOZZLE ADJUSTMENT.) |
| 6 | Rear washer hose<br>(See 09-19-12 REAR WASHER HOSE REMOVAL/INSTALLATION.) |
| 7 | Rear wiper motor<br>(See 09-19-10 REAR WIPER MOTOR REMOVAL/INSTALLATION.)<br>(See 09-19-10 REAR WIPER MOTOR INSPECTION.) |
| 8 | Rear wiper arm and blade<br>(See 09-19-9 REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION.)<br>(See 09-19-10 REAR WIPER ARM AND BLADE ADJUSTMENT.) |
| 9 | Wiper and washer switch<br>(See 09-19-8 WIPER AND WASHER SWITCH REMOVAL/INSTALLATION.)<br>(See 09-19-8 WINDSHIELD WIPER AND WASHER SWITCH INSPECTION.)<br>(See 09-19-9 REAR WIPER AND WASHER SWITCH INSPECTION.) |
| 10 | Washer tank<br>(See 09-19-5 WASHER TANK REMOVAL/INSTALLATION.) |
| 11 | Washer fluid-level sensor<br>(See 09-19-7 WASHER FLUID-LEVEL SENSOR REMOVAL/INSTALLATION.)<br>(See 09-19-8 WASHER FLUID-LEVEL SENSOR INSPECTION.) |

| | |
|---|---|
| 12 | Rear washer motor<br>(See 09-19-11 REAR WASHER MOTOR REMOVAL/INSTALLATION.)<br>(See 09-19-11 REAR WASHER MOTOR INSPECTION.) |

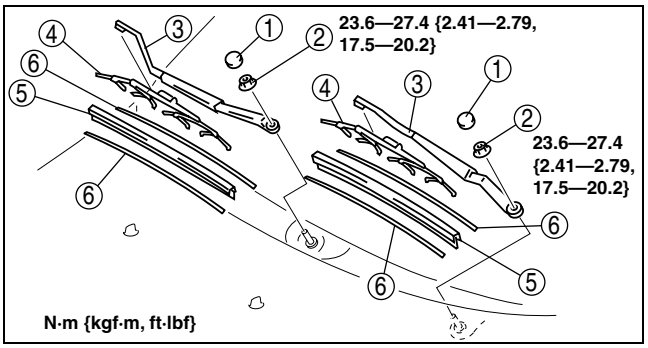
| | |
|---|---|
| 13 | Windshield washer motor<br>(See 09-19-6 WINDSHIELD WASHER MOTOR REMOVAL/INSTALLATION.)<br>(See 09-19-6 WINDSHIELD WASHER MOTOR INSPECTION.) |

### WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION

id091900800700

1. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Cap |
| 2 | Nut |
| 3 | Windshield wiper arm<br>(See 09-19-3 Windshield Wiper Arm Installation Note.) |
| 4 | Windshield wiper blade |
| 5 | Rubber brush |
| 6 | Backing plate |

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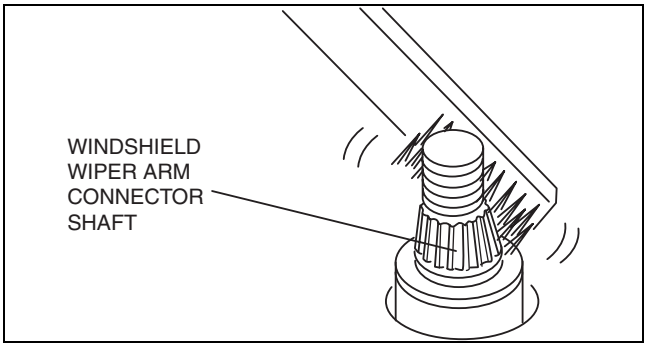
2. Install in the reverse order of removal.
3. Adjust the windshield wiper arm and blade. (See 09-19-4 WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT.)

**Windshield Wiper Arm Installation Note**

1. Clean the windshield wiper arm connector shafts using a wire brush before installing the windshield wiper arms.

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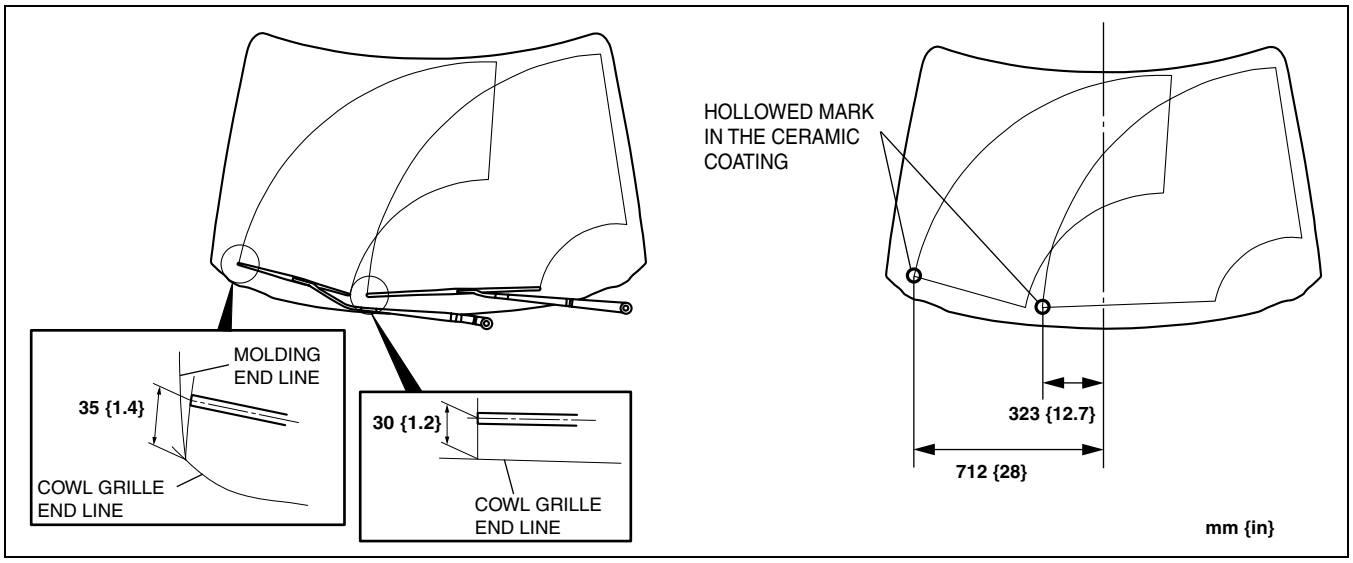
### WINDSHIELD WIPER ARM AND BLADE ADJUSTMENT

id091900800800

1. Operate the windshield wipers, and then turn off the windshield wiper motor to set the wipers in the park position.
2. Slide the serrated connecting part and adjust the windshield wiper arm and blade so that its end is aligned with the hollowed mark in the ceramic coating.

**Note**

- If the hollowed mark in the ceramic coating cannot be located, measure the distance from the cowl grille end line, and adjust the windshield wiper arm and blade.

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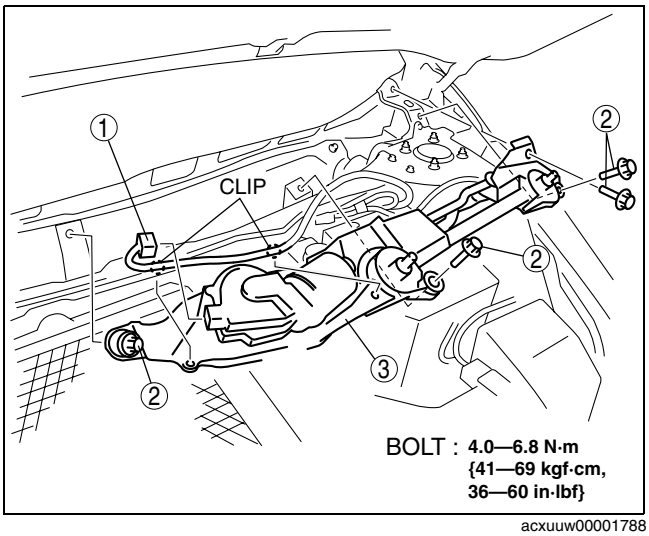
### WINDSHIELD WIPER MOTOR REMOVAL/INSTALLATION

id091900800900

1. Disconnect the negative battery cable.
2. Remove the windshield wiper arm and blade. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
3. Remove the cowl grille. (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Bolt |
| 3 | Windshield wiper motor |

5. Install in the reverse order of removal.

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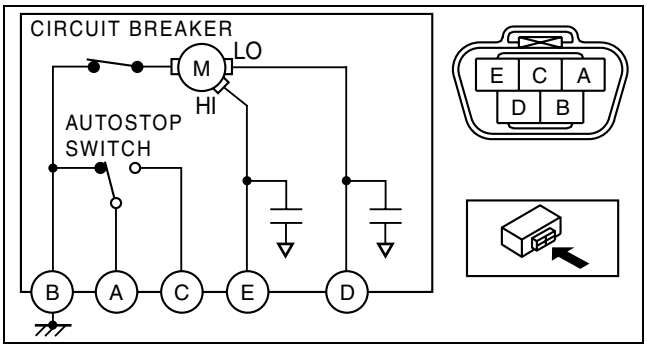
## WINDSHIELD WIPER MOTOR INSPECTION

id091900801100

1. Disconnect the windshield wiper motor connector.
2. Connect battery positive voltage to windshield wiper motor terminal D or E, and ground to terminal B, then verify that the windshield wipers operate as shown in the table.
   - If the windshield wipers do not operate as indicated in the table, replace the windshield wiper motor.

| Terminal connected to battery positive voltage | Operation condition |
|---|---|
| D | LO |
| E | HI |

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3. Disconnect battery positive voltage from the motor terminal D while the wipers are operating.
4. Verify that the wipers do not stop in the park position.
5. Short between the motor terminals D and C, and connect battery positive voltage to the motor terminal A.
6. Verify that the wipers operate at low speed again, then stop in the park position.
   - If there is any malfunction, replace the windshield wiper motor.

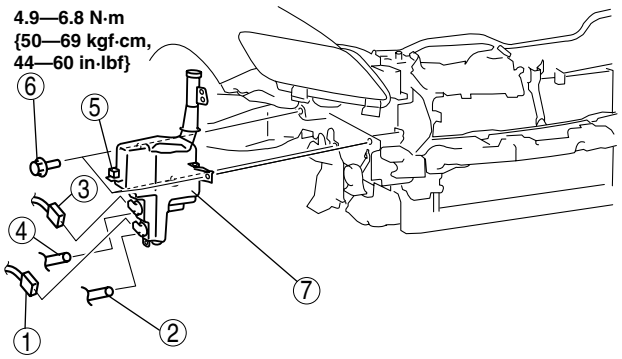
## WASHER TANK REMOVAL/INSTALLATION

id091900801700

1. Disconnect the negative battery cable.
2. Remove the mudguard (RH). (Vehicles without washer fluid-level sensor)
3. Remove the front bumper. (Vehicles with washer fluid-level sensor) (See 09-10-2 FRONT BUMPER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Windshield washer motor connector |
| 2 | Windshield washer hose |
| 3 | Rear washer motor connector |
| 4 | Rear washer hose |
| 5 | Washer fluid-level sensor connector |
| 6 | Bolt |
| 7 | Washer tank |

**VEHICLES WITH WASHER FLUID-LEVEL SENSOR**

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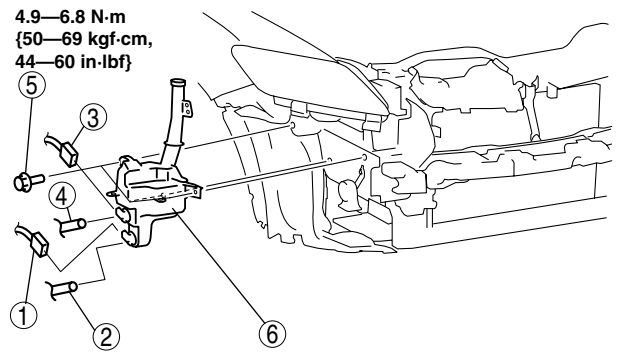
| | |
|---|---|
| 1 | Windshield washer motor connector |
| 2 | Windshield washer hose |
| 3 | Rear washer motor connector |
| 4 | Rear washer hose |
| 5 | Bolt |
| 6 | Washer tank |

**VEHICLES WITHOUT WASHER FLUID-LEVEL SENSOR**

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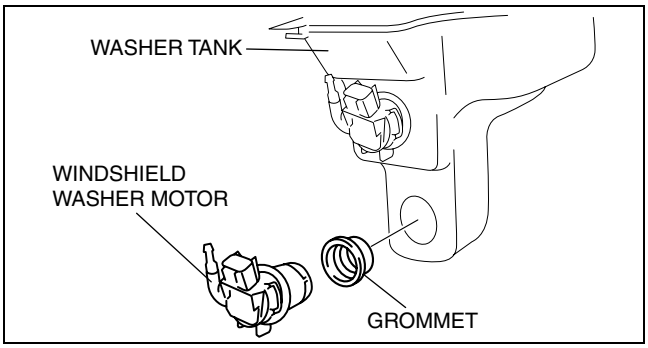
5. Install in the reverse order of removal.

### WINDSHIELD WASHER MOTOR REMOVAL/INSTALLATION

id091900802400

1. Disconnect the negative battery cable.
2. Remove the mudguard (RH).
3. Disconnect the connector.
4. Disconnect the windshield washer hose.
5. Remove the windshield washer motor, then remove the grommet.
6. Install in the reverse order of removal.

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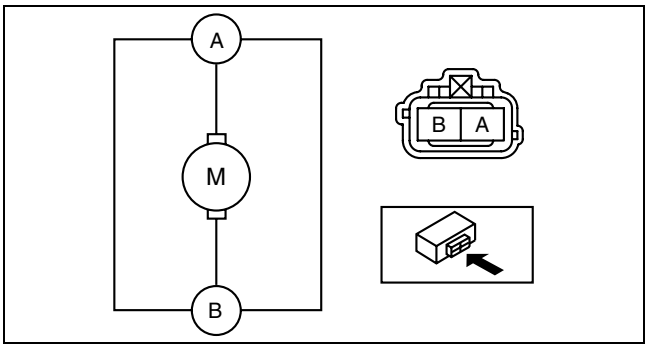
### WINDSHIELD WASHER MOTOR INSPECTION

id091900802500

1. Connect battery positive voltage to windshield washer motor terminal A and terminal B to ground.
2. Verify that the windshield washer motor operates normally.
   - If there is any malfunction, replace the windshield washer motor.

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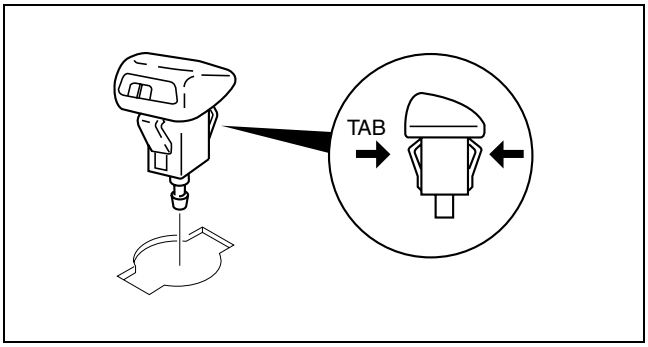
### WINDSHIELD WASHER NOZZLE REMOVAL/INSTALLATION

id091900802000

1. Remove the windshield wiper arm and blade. (See 09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
2. Remove the cowl grille. (See 09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)
3. Remove the windshield washer hose from the windshield washer nozzle.
4. Squeeze the tabs of the windshield washer nozzle.
5. Pull the windshield washer nozzle out to remove it.
6. Install in the reverse order of removal.

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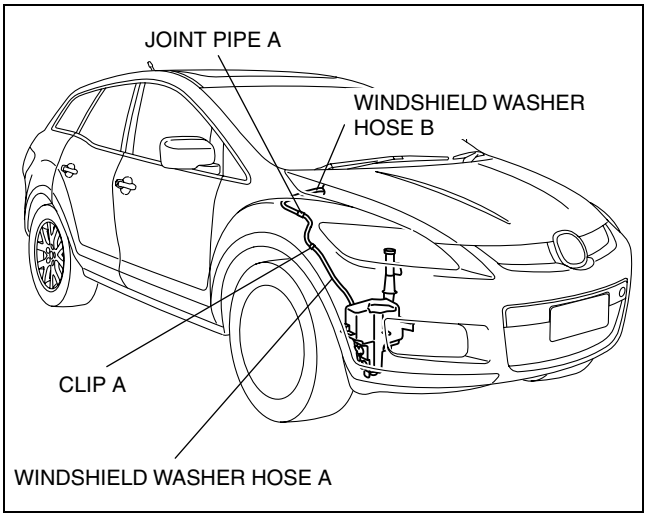
## WINDSHIELD WASHER HOSE REMOVAL/INSTALLATION

id091900802100

1. Remove the mudguard (RH).
2. Disconnect windshield washer hose A from the windshield washer motor.
3. Remove windshield washer hose A from clip A.
4. Disconnect joint pipe A and remove windshield washer hose A, B.
5. Remove the windshield wiper arm and blade. (See.09-19-3 WINDSHIELD WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
6. Remove the cowl grill. (See.09-16-11 COWL GRILLE REMOVAL/INSTALLATION.)

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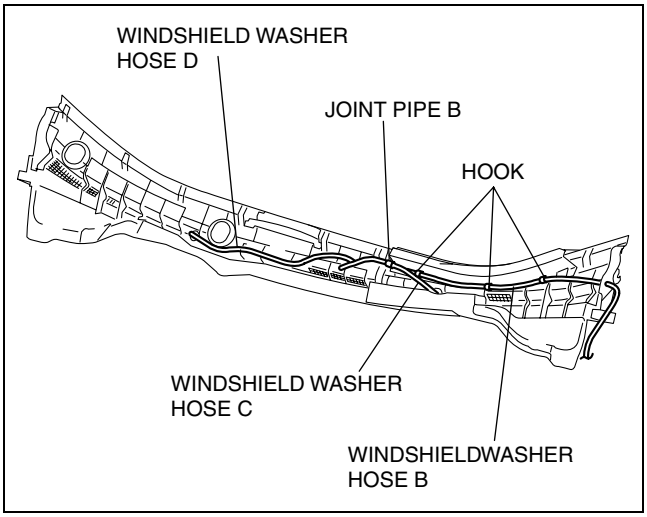
7. Remove windshield washer hose B from hook.
8. Disconnect windshield washer hose C from the washer nozzle.
9. Disconnect windshield washer hose D from the washer nozzle.
10. Disconnect joint pipe B and remove windshield washer hose C, B and D.
11. Install in the reverse order of removal.

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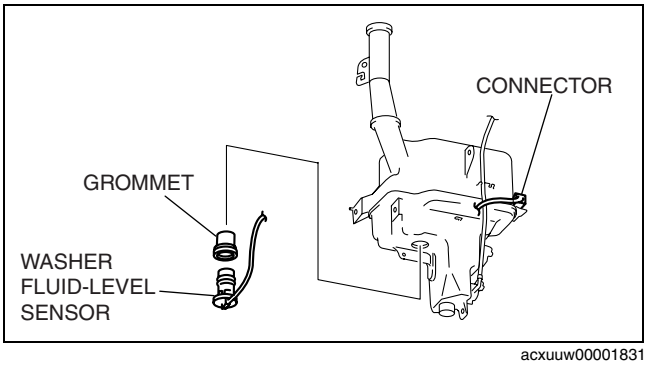
## WASHER FLUID-LEVEL SENSOR REMOVAL/INSTALLATION

id091900801800

1. Disconnect the negative battery cable.
2. Remove the washer tank. (See 09-19-5 WASHER TANK REMOVAL/INSTALLATION.)
3. Disconnect the connector.
4. Remove the washer fluid-level sensor.
5. Remove the grommet.
6. Install in the reverse order of removal.

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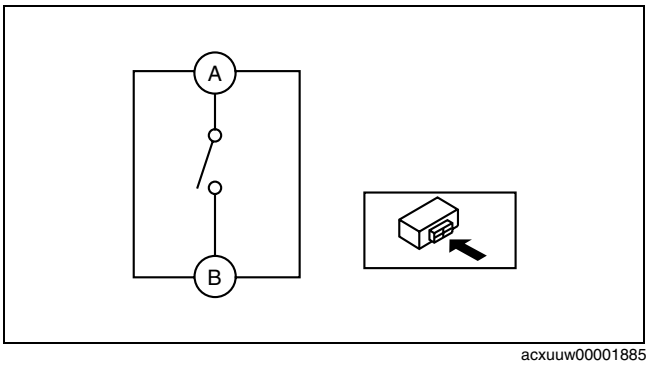
## WASHER FLUID-LEVEL SENSOR INSPECTION

id091900801900

1. Disconnect the negative battery cable.
2. Inspect for continuity between the washer fluid-level sensor terminals using an ohmmeter.
   - If not as specified, replace the washer fluid-level sensor.

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: Continuity

| Fluid level | Terminal | |
|---|---|---|
| | A | B |
| Above low | | |
| Below low | ○ | ○ |

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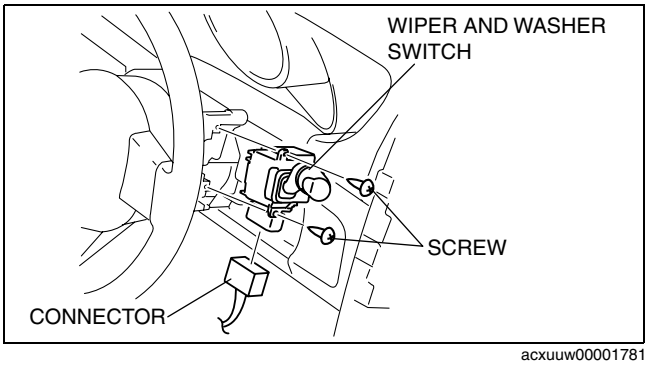
## WIPER AND WASHER SWITCH REMOVAL/INSTALLATION

id091900800200

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Disconnect the wiper and washer switch connector.
4. Remove the screws, then remove the wiper and washer switch.
5. Install in the reverse order of removal.

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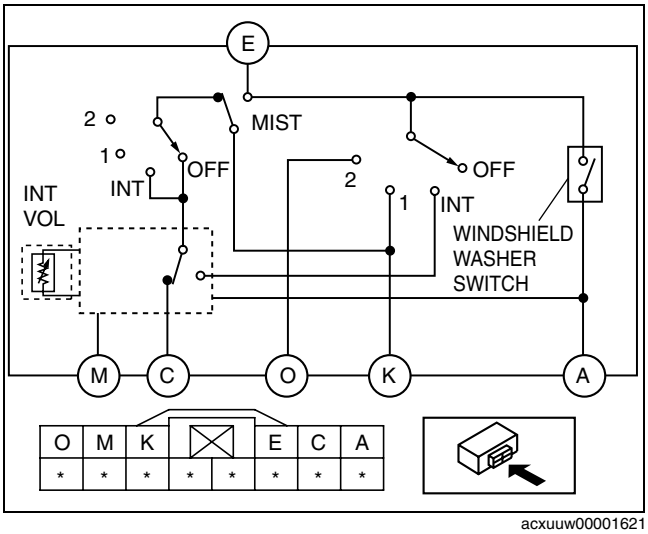
## WINDSHIELD WIPER AND WASHER SWITCH INSPECTION

id091900800300

1. Verify that the continuity between the windshield wiper and washer switch is as indicated in the table.
   - If not as indicated in the table, replace the wiper and washer switch.

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: Continuity

| Switch position | | Mist | Terminal | | | | |
|---|---|---|---|---|---|---|---|
| | | | A | C | E | K | O |
| Windshield wiper switch | OFF | OFF | | ○ | | ○ | |
| | | ON | | | ○ | ○ | |
| | INT | | | ○ | | ○ | |
| | 1 | | | | ○ | ○ | |
| | 2 | | | | ○ | | ○ |
| Windshield washer switch | ON | | ○ | | ○ | | |

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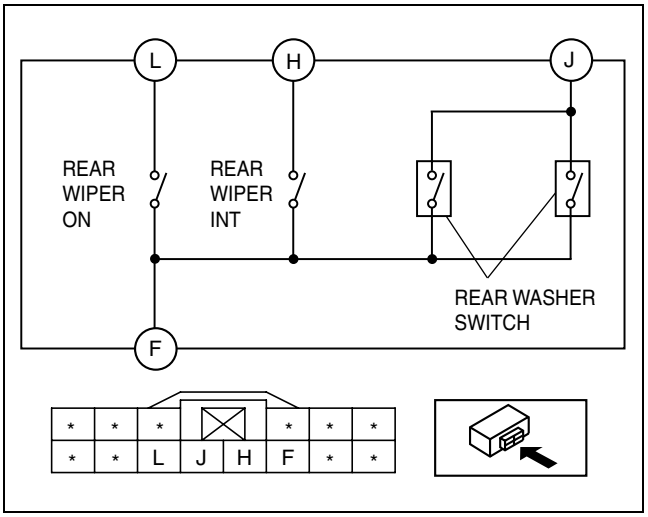
## REAR WIPER AND WASHER SWITCH INSPECTION

id091900800400

1. Verify that the continuity between the rear wiper and washer switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the wiper and washer switch.

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○—○ : Continuity

| Switch position | | Terminal | | | |
|---|---|---|---|---|---|
| | | F | H | J | L |
| Rear wiper switch | OFF | | | | |
| | ON | ○ | | | ○ |
| | INT | ○ | ○ | | |
| Rear wiper and washer switch | ON | ○ | | ○ | ○ |
| Rear washer switch | ON | ○ | | ○ | |

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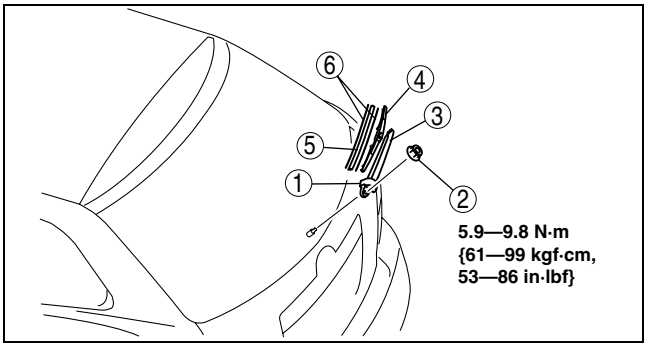
## REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION

id091900801200

1. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Cap |
| 2 | Nut |
| 3 | Rear wiper arm<br>(See 09-19-9 Rear Wiper Arm Installation Note.) |
| 4 | Rear wiper blade |
| 5 | Rubber brush |
| 6 | Backing plate |

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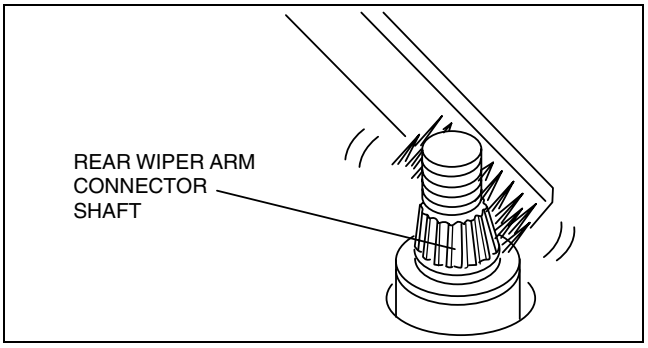
2. Install in the reverse order of removal.
3. Adjust the rear wiper arm and blade. (See 09-19-10 REAR WIPER ARM AND BLADE ADJUSTMENT.)

### Rear Wiper Arm Installation Note

1. Clean the rear wiper arm connector shaft using a wire brush before installing the rear wiper arm.

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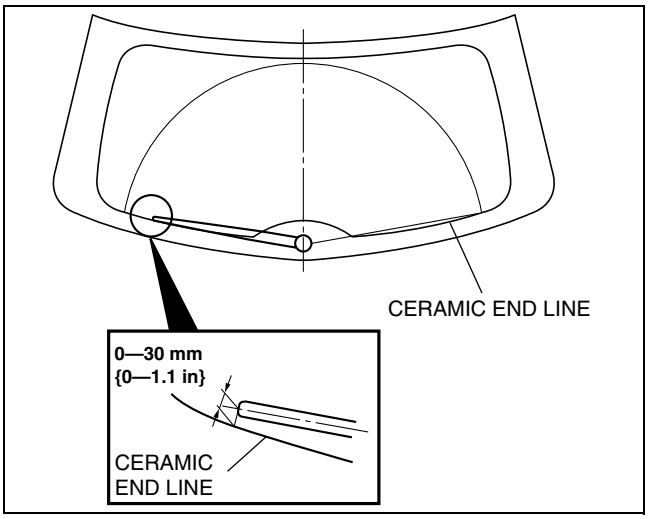
## REAR WIPER ARM AND BLADE ADJUSTMENT

id091900801300

1. Turn off the rear wiper switch while operating the rear wiper motor, and then stop the rear wiper at the auto-stop position.
2. Set the rear wiper arm onto the ceramic end line.

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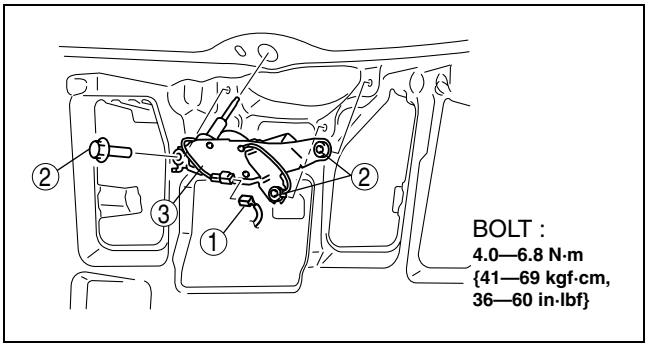
## REAR WIPER MOTOR REMOVAL/INSTALLATION

id091900801400

1. Disconnect the negative battery cable.
2. Remove the rear wiper arm and blade. (See 09-19-9 REAR WIPER ARM AND BLADE REMOVAL/INSTALLATION.)
3. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
4. Remove the liftgate side trim. (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION.)
5. Remove the liftgate lower trim. (See 09-17-26 LIFTGATE LOWER TRIM REMOVAL/INSTALLATION.)
6. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Rear wiper motor connector |
| 2 | Bolt |
| 3 | Rear wiper motor |

7. Install in the reverse order of removal.

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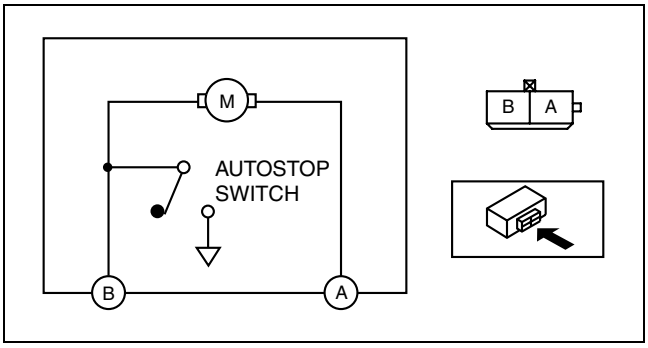
## REAR WIPER MOTOR INSPECTION

id091900801500

1. Connect battery positive voltage to the rear wiper motor terminal A, and ground the rear wiper motor terminal B.
2. Verify that the rear wiper motor operates.
   - If there is any malfunction, replace the rear wiper motor.

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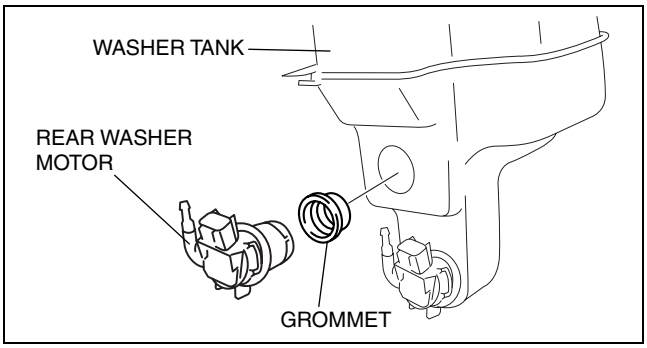
### REAR WASHER MOTOR REMOVAL/INSTALLATION

id091900802600

1. Disconnect the negative battery cable.
2. Remove the mudguard (RH).
3. Disconnect the connector.
4. Disconnect the rear washer hose.
5. Remove the rear washer motor, then remove the grommet.
6. Install in the reverse order of removal.

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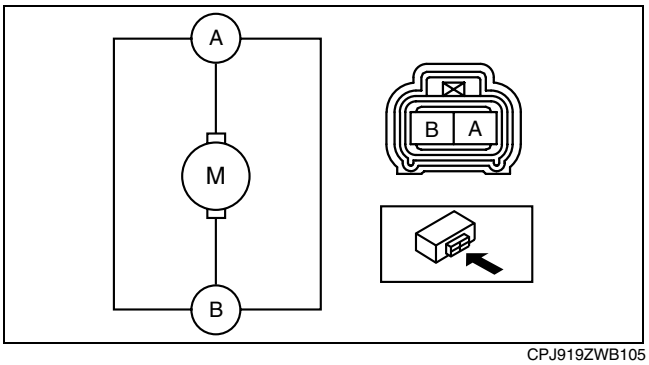
### REAR WASHER MOTOR INSPECTION

id091900802700

1. Connect battery positive voltage to rear washer motor terminal A and terminal B to ground.
2. Verify that the rear washer motor operates normally.
   - If there is any malfunction, replace the rear washer motor.

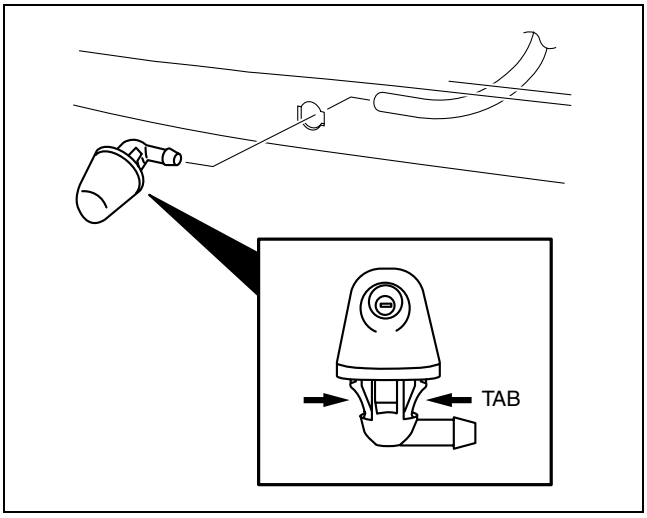



CPJ919ZWB105

### REAR WASHER NOZZLE REMOVAL/INSTALLATION

id091900802200

1. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
2. Remove the rear spoiler. (See 09-16-12 REAR SPOILER REMOVAL/INSTALLATION.)
3. Press the tabs and remove the rear washer nozzle.
4. Install in the reverse order of removal.
5. Adjust the rear washer nozzle. (See 09-19-12 REAR WASHER NOZZLE ADJUSTMENT.)

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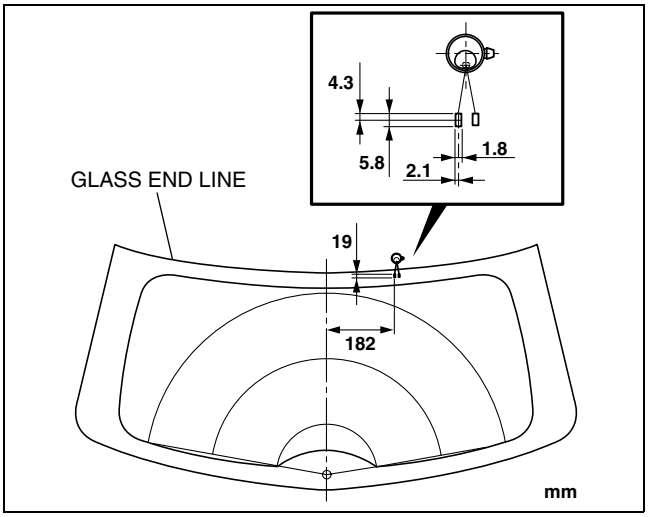
### REAR WASHER NOZZLE ADJUSTMENT

id091900802300

1. Insert a needle or an equivalent tool into the spray hole of the rear washer nozzle and adjust the nozzle direction as shown.

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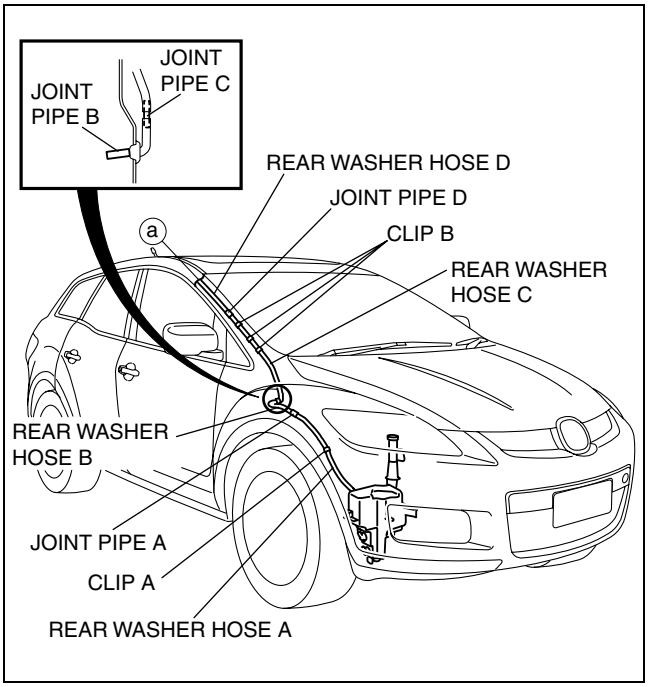
### REAR WASHER HOSE REMOVAL/INSTALLATION

id091900801600

1. Disconnect the negative battery cable.
2. Remove the mudguard (RH).
3. Disconnect rear washer hose A from the washer tank.
4. Remove rear washer hose A from clip A.
5. Disconnect joint pipe A and remove rear washer hose A.
6. Remove the following parts:
   (1) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (2) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (3) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (4) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (5) Dashboard under cover
   (6) Glove compartment (See 09-17-8 GLOVE COMPARTMENT REMOVAL/INSTALLATION.)
   (7) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (8) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (9) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
   (10) Audio unit (See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.)
   (11) Climate control unit (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL/INSTALLATION [FULL-AUTO AIR CONDITIONER].) (See 07-40-25 CLIMATE CONTROL UNIT REMOVAL [MANUAL AIR CONDITIONER].) (See 07-40-26 CLIMATE CONTROL UNIT INSTALLATION [MANUAL AIR CONDITIONER].)
   (12) Knee bolster (See 09-17-12 KNEE BOLSTER REMOVAL/INSTALLATION.)
   (13) Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
   (14) Column cover (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
   (15) Instrument cluster (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
   (16) Driver-side air bag module (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
   (17) Steering wheel (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (18) Combination switch (See 09-18-13 COMBINATION SWITCH REMOVAL/INSTALLATION.)
   (19) Steering shaft (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
   (20) A-pillar lower trim (See 09-17-16 A-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
   (21) A-pillar trim (See 09-17-15 A-PILLAR TRIM REMOVAL/INSTALLATION.)
   (22) Dashboard (See 09-17-4 DASHBOARD REMOVAL/INSTALLATION.)

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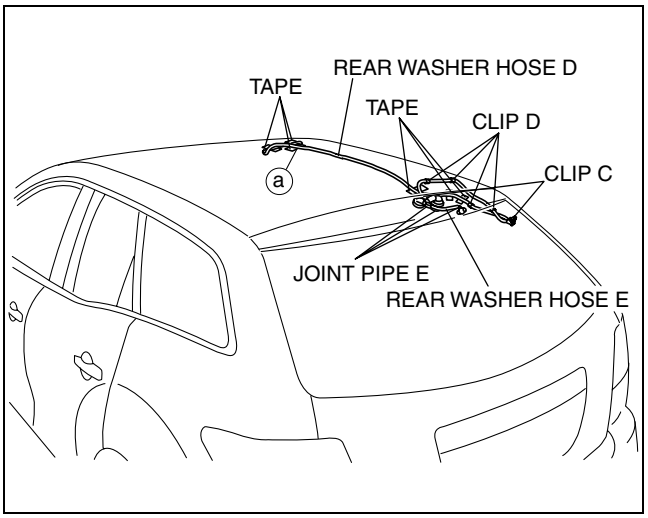
7. Disconnect joint pipe B and remove rear washer hose B.
8. Disconnect joint pipe C and remove rear washer hose C.
9. Remove rear washer hose C from clips B.
10. Disconnect joint pipe D and remove rear washer hose C.
11. Detach clips B.
12. Remove the following parts:
    (1) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
    (2) B-pillar lower trim (See 09-17-16 B-PILLAR LOWER TRIM REMOVAL/INSTALLATION.)
    (3) Front seat belt upper anchor installation bolt (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
    (4) B-pillar upper trim (See 09-17-16 B-PILLAR UPPER TRIM REMOVAL/INSTALLATION.)
    (5) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
    (6) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
    (7) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
    (8) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
    (9) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
    (10) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
    (11) Map light (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
    (12) Sunvisor (See 09-17-26 SUNVISOR REMOVAL/INSTALLATION.)
    (13) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
13. Disconnect joint pipe E.
14. Remove the headliner. (See 09-17-27 HEADLINER REMOVAL/INSTALLATION.)
15. Remove rear washer hose D from clips C and D.
16. Cut the urethane of the headliner and remove the tape and rear washer hose D.

**Note**
- After installing the rear washer hose, reinforce the urethane that was cut when removing.

17. Remove rear washer hose E from the rear washer nozzle.
18. Install in the reverse order of removal.



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# 09-20 ENTERTAINMENT

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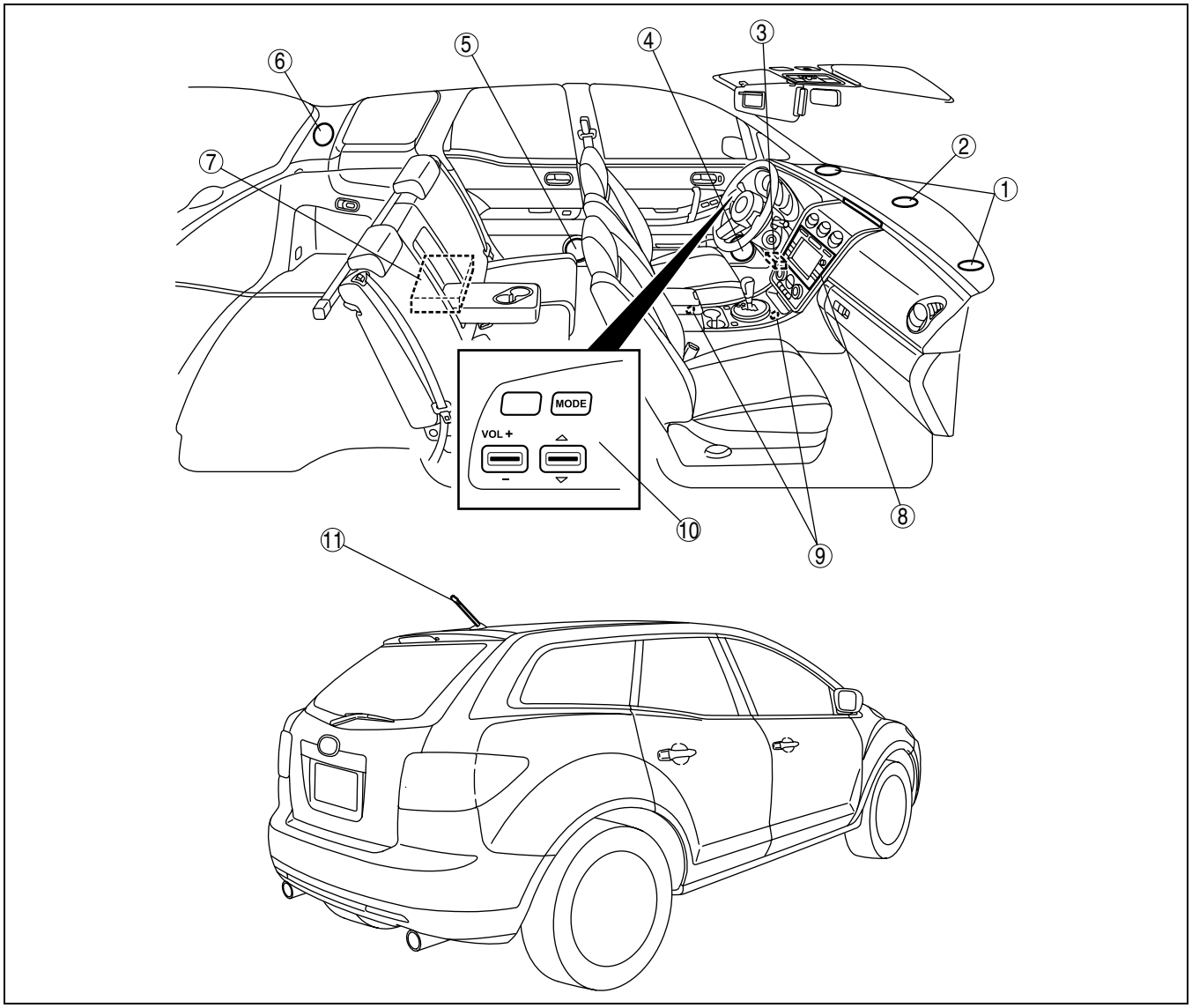
## ENTERTAINMENT LOCATION INDEX

id092000800100

### Audio System

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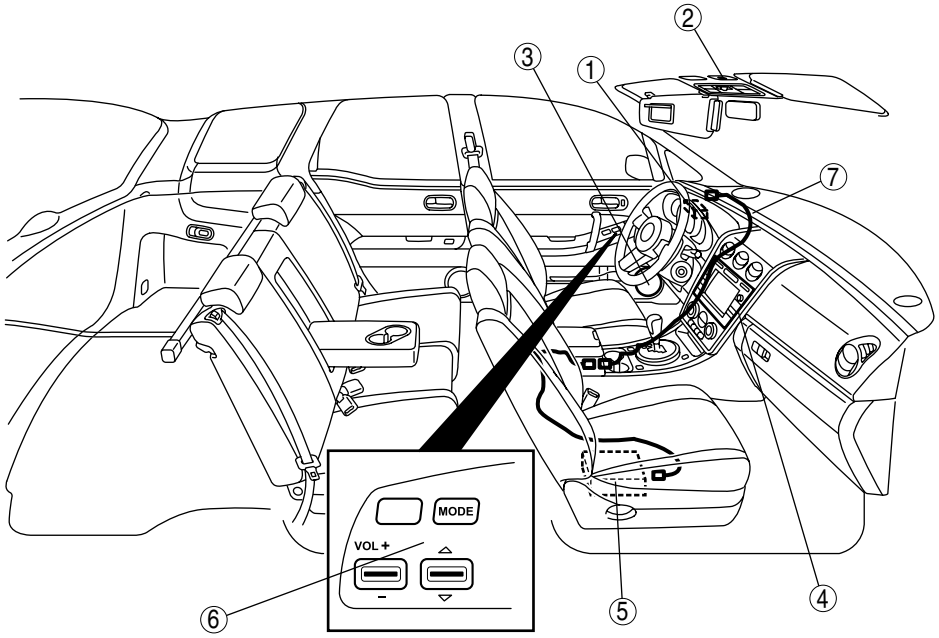
| | |
|---|---|
| 1 | Front speaker<br>(See 09-20-8 FRONT SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 FRONT SPEAKER INSPECTION.) |
| 2 | Center speaker<br>(See 09-20-9 CENTER SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-9 CENTER SPEAKER INSPECTION.) |
| 3 | Audiopilot microphone<br>(See 09-20-10 AUDIOPILOT MICROPHONE REMOVAL/INSTALLATION.) |
| 4 | Front door speaker<br>(See 09-20-6 FRONT DOOR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-7 FRONT DOOR SPEAKER INSPECTION.) |
| 5 | Rear door speaker<br>(See 09-20-7 REAR DOOR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-8 REAR DOOR SPEAKER INSPECTION.) |

| | |
|---|---|
| 6 | Rear speaker<br>(See 09-20-8 REAR SPEAKER REMOVAL/ INSTALLATION.)<br>(See 09-20-9 REAR SPEAKER INSPECTION.) |
| 7 | Audio amplifier<br>(See 09-20-6 AUDIO AMPLIFIER REMOVAL/ INSTALLATION.) |
| 8 | Audio unit<br>(See 09-20-14 ACCESSORY SOCKET REMOVAL/ INSTALLATION.)<br>(See 09-20-15 ACCESSORY SOCKET INSPECTION.) |
| 9 | Accessory socket<br>(See 09-20-13 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)<br>(See 09-20-13 AUDIO CONTROL SWITCH INSPECTION.) |
| 10 | Audio control switch<br>(See 09-20-13 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)<br>(See 09-20-13 AUDIO CONTROL SWITCH INSPECTION.) |

| | |
|---|---|
| 11 | Center roof antenna<br>(See 09-20-10 CENTER ROOF ANTENNA REMOVAL/INSTALLATION.)<br>(See 09-20-11 CENTER ROOF ANTENNA INSPECTION.)<br>(See 09-20-12 ANTENNA FEEDER LOCATION.)<br>(See 09-20-12 FRONT ANTENNA FEEDER INSPECTION.)<br>(See 09-20-12-1 REAR ANTENNA FEEDER INSPECTION.) |

**Car-navigation System**

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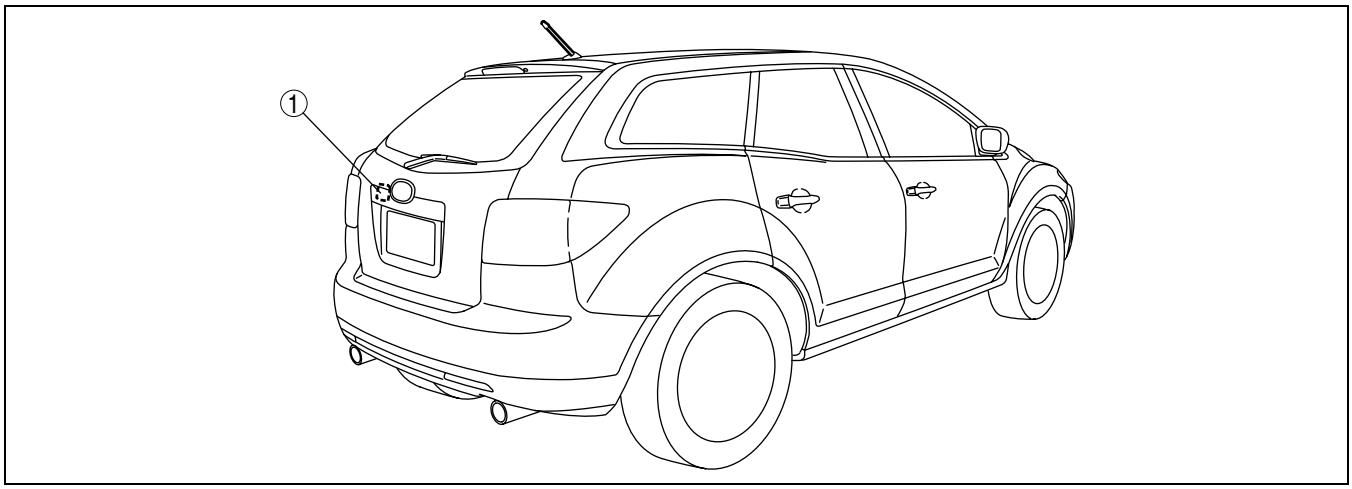
| | |
|---|---|
| 1 | GPS antenna<br>(See09-20-11 GPS ANTENNA REMOVAL/INSTALLATION.) |
| 2 | Microphone<br>(See 09-20-14 MICROPHONE REMOVAL/INSTALLATION.) |
| 3 | Front door speaker<br>(See 09-20-6 FRONT DOOR SPEAKER REMOVAL/INSTALLATION.)<br>(See 09-20-7 FRONT DOOR SPEAKER INSPECTION.) |
| 4 | Audio unit<br>(See 09-20-4 AUDIO UNIT REMOVAL/INSTALLATION.) |
| 5 | Car-navigation unit<br>(See 09-20-5 CAR-NAVIGATION UNIT REMOVAL/INSTALLATION.) |
| 6 | Audio control switch<br>(See 09-20-13 AUDIO CONTROL SWITCH REMOVAL/INSTALLATION.)<br>(See 09-20-13 AUDIO CONTROL SWITCH INSPECTION.) |
| 7 | GPS antenna feeder<br>(See 09-20-12 ANTENNA FEEDER LOCATION.)<br>(See 09-20-12-1 GPS ANTENNA FEEDER INSPECTION.) |

**Rear view monitor**

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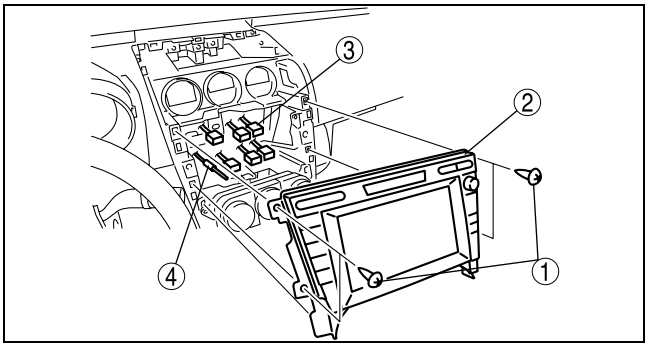
| | |
|---|---|
| 1 | Rear mount camera<br>(See09-20-14 REAR MOUNT CAMERA REMOVAL/INSTALLATION.) |

**AUDIO UNIT REMOVAL/INSTALLATION**

id092000805500

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Center panel (See 09-17-8 CENTER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Audio unit<br>(See 09-20-5 Audio Unit Removal Note.) |
| 3 | Connector |
| 4 | Antenna feeder |

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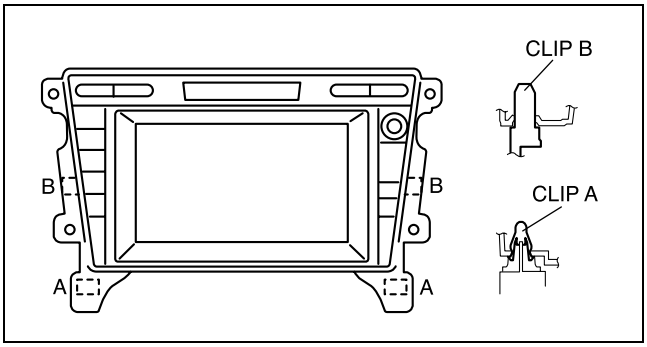
4. Install in the reverse order of removal.

**Caution**

- **When installing the Audio unit, make sure that the wiring harness and antenna feeder are not caught between the unit and dashboard.If the wiring harness or the antenna feeder is caught between the unit and dashboard, it may cause malfunctions.**

**Audio Unit Removal Note**

1. Detach clip A using a flathead screwdriver.
2. Pull the Audio unit outward, detach clip B from the dashboard, and then remove the Audio unit.

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**AUDIO UNIT DISASSEMBLY/ASSEMBLY**

id092000800800

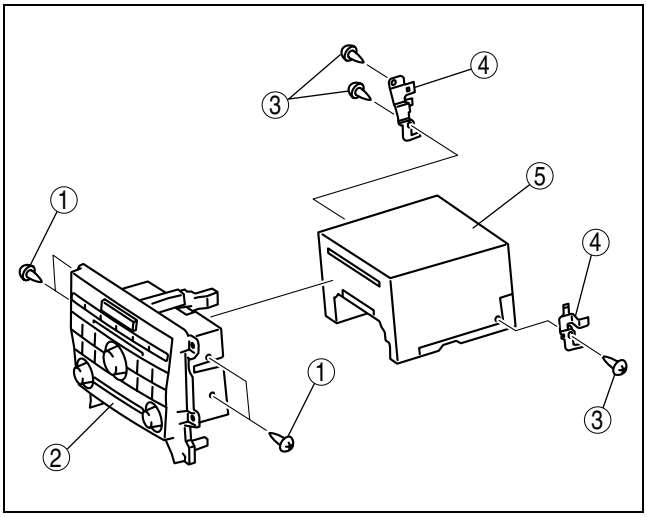
**Standard Specification Type**

**Caution**

- **Before disassembling the audio unit, spread a cloth on the floor to put the disassembled parts on. This protects the surface of the panel from scratches or dirt.**

1. Disassemble in the order indicated in the table.
2. Assemble in the reverse order of disassembly.

| | |
|---|---|
| 1 | Screw A |
| 2 | Audio cover |
| 3 | Screw B |
| 4 | Bracket |
| 5 | Base unit |

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**CAR-NAVIGATION UNIT REMOVAL/INSTALLATION**

id092000801000

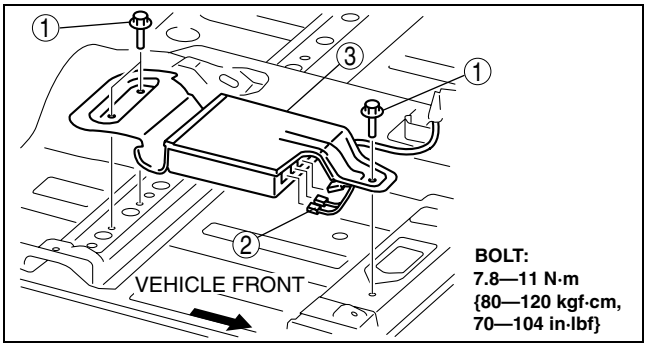
**Note**

- Car-navigation unit is located under the front seat (passenger's side).

1. Disconnect the negative battery cable.
2. Remove the seat belt anchor. (passenger's side) (See 08-11-2 FRONT SEAT BELT REMOVAL/INSTALLATION.)
3. Remove the front seat. (passenger's side) (See 09-13-2 FRONT SEAT REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Connector |
| 3 | Car-navigation unit |

5. Install in the reverse order of removal.

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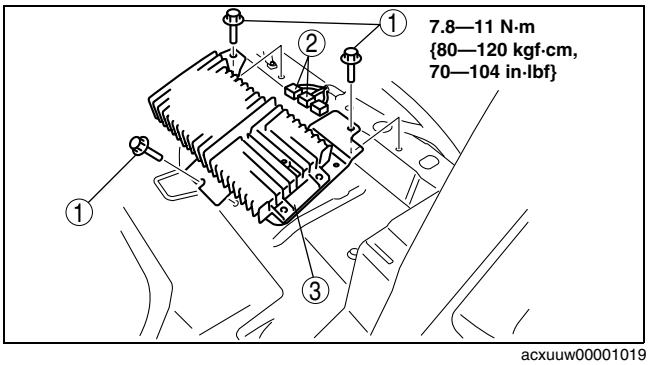
## AUDIO AMPLIFIER REMOVAL/INSTALLATION

id092000801100

1. Disconnect the negative battery cable.
2. Remove the sub trunk box. (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
3. Fold the second-row seat backs forward.
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Bolt |
| 2 | Connector |
| 3 | Audio amplifier |

5. Install in the reverse order of removal.

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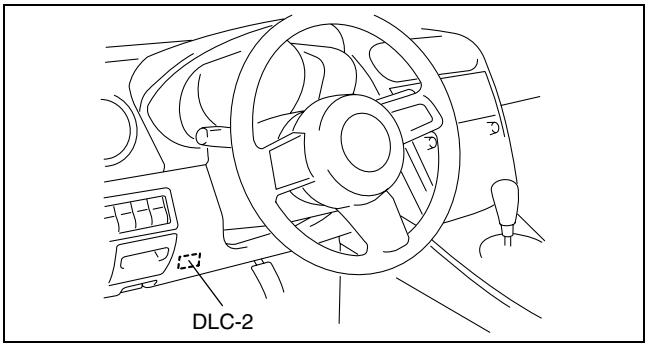
## AUDIO AMPLIFIER CONFIGURATION

id092000805300

1. Connect the M-MDS to DLC-2.
2. After the vehicle is identified, select the following items from the initial screen of the M-MDS.
   - When using the IDS (notebook PC)
     1. Select the “Module Programming”.
   - When using the PDS (pocket PC)
     1. Select “Programming”.
     2. Select “Module Programming”.
3. Then, select the “Programmable Module Installation”, “AM” from the screen menu.
4. Perform the configuration according to the directions on the screen.

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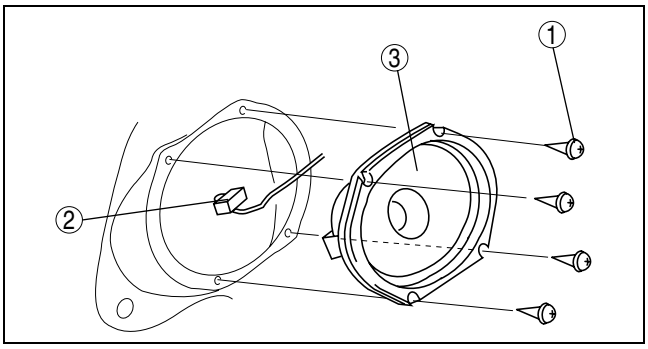
## FRONT DOOR SPEAKER REMOVAL/INSTALLATION

id092000802200

1. Disconnect the negative battery cable.
2. Remove the inner garnish. (See 09-17-20 INNER GARNISH REMOVAL/INSTALLATION.)
3. Remove the front door trim. (See 09-17-20 FRONT DOOR TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | Front door speaker<br>(See 09-20-7 Front Door Speaker Installation Note.) |

5. Install in the reverse order of removal.

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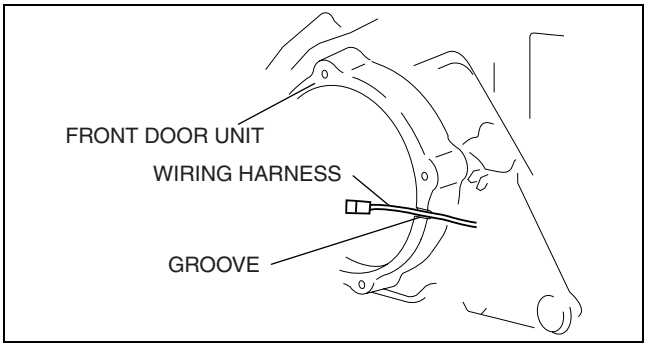
**Front Door Speaker Installation Note**

1. Remove the speaker with the wiring harness passing through the groove of the front door module.

**Caution**

- **If the speaker is installed with the wiring harness out of the groove, an open circuit in the wiring harness could occur.**

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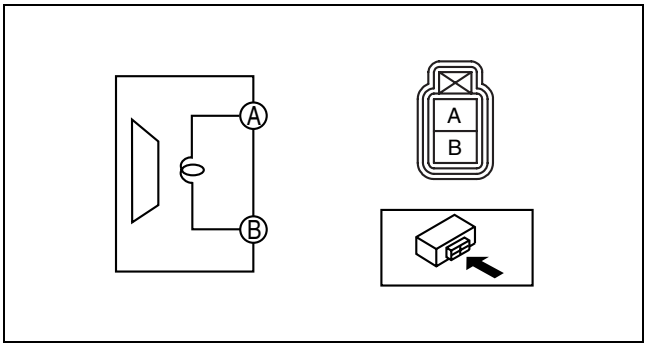
**FRONT DOOR SPEAKER INSPECTION**

id092000802300

1. Verify the resistance between front door speaker terminals.
   - If the resistance is not within the specification, replace the front door speaker.

**Resistance**
**Standard: 4 ohms**
**Bose: 2 ohms**

2. Connect a **1.5 V** battery to the front door speaker and verify that noise is heard from the front door speaker.
   - If no noise is heard, replace the front door speaker.




acxuuw00001194

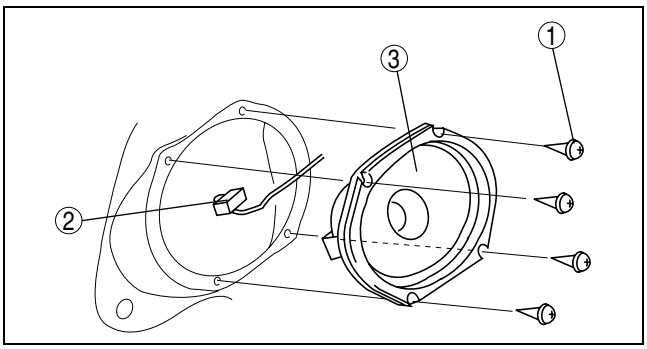
**REAR DOOR SPEAKER REMOVAL/INSTALLATION**

id092000805000

1. Disconnect the negative battery cable.
2. Remove the rear door trim. (See 09-17-23 REAR DOOR TRIM REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | Rear door speaker<br>(See 09-20-7 Rear Door Speaker Installation Note.) |

4. Install in the reverse order of removal.

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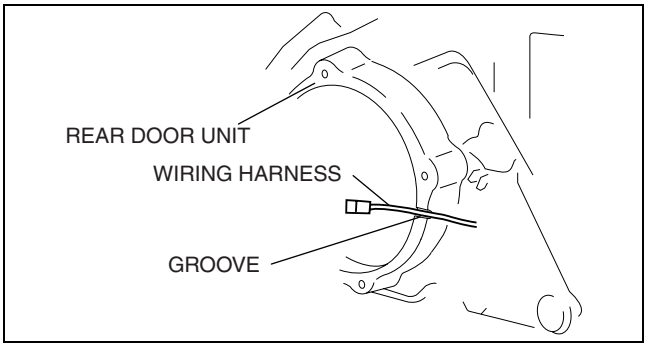
**Rear Door Speaker Installation Note**

1. Remove the speaker with the wiring harness passing through the groove of the rear door module.

**Caution**

- **If the speaker is installed with the wiring harness out of the groove, an open circuit in the wiring harness could occur.**

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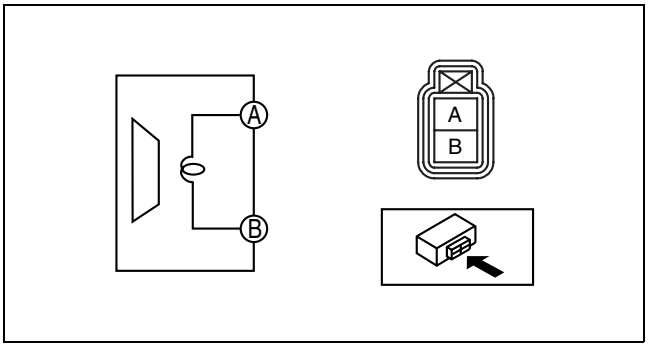
### REAR DOOR SPEAKER INSPECTION

id092000804900

1. Verify the resistance between rear door speaker terminals.
   - If the resistance is not within the specification, replace the rear door speaker.

   **Resistance**
   **Standard: 4 ohms**
   **Bose: 2.15 ohms**

2. Connect a **1.5 V** battery to the rear door speaker and verify that noise is heard from the rear door speaker.
   - If no noise is heard, replace the rear door speaker.

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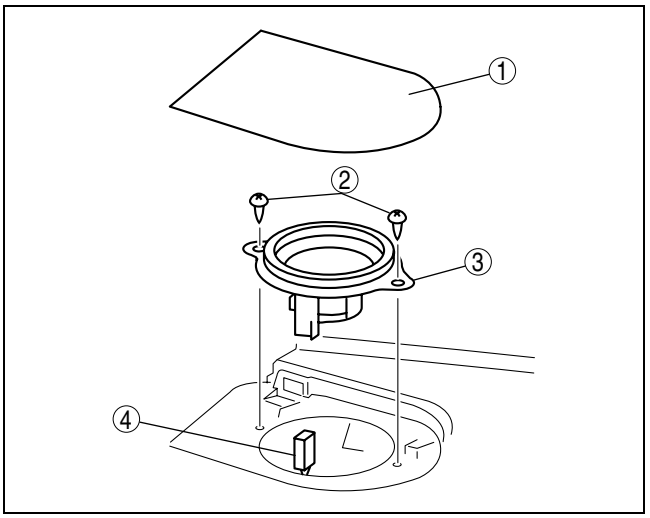
### FRONT SPEAKER REMOVAL/INSTALLATION

id092000806600

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Cover |
| 2 | Screw |
| 3 | Speaker |
| 4 | Connector |

3. Install in the reverse order of removal.

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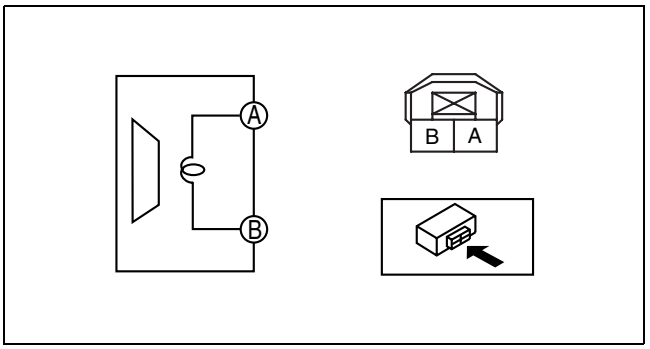
### FRONT SPEAKER INSPECTION

id092000806700

1. Verify the resistance between front speaker terminals.
   - If the resistance is not within the specification, replace the front speaker.

   **Resistance**
   **3.6 ohms**

2. Connect a **1.5 V** battery to the front speaker and verify that noise is heard from the front speaker.
   - If no noise is heard, replace the front speaker.

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### REAR SPEAKER REMOVAL/INSTALLATION

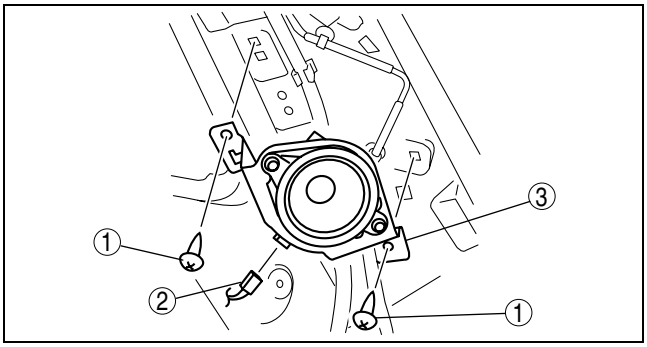
id092000802400

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (6) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)

3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | Rear speaker |

4. Install in the reverse order of removal.




acxuuw00001808

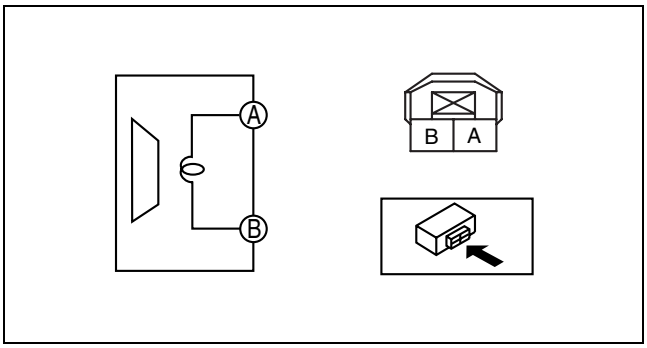
### REAR SPEAKER INSPECTION

id092000802500

1. Verify the resistance between front speaker terminals.
   - If the resistance is not within the specification, replace the front speaker.

   **Resistance**
   **3.6 ohms**

2. Connect a **1.5 V** battery to the front speaker and verify that noise is heard from the front speaker.
   - If no noise is heard, replace the front speaker.




acxuuw00001809

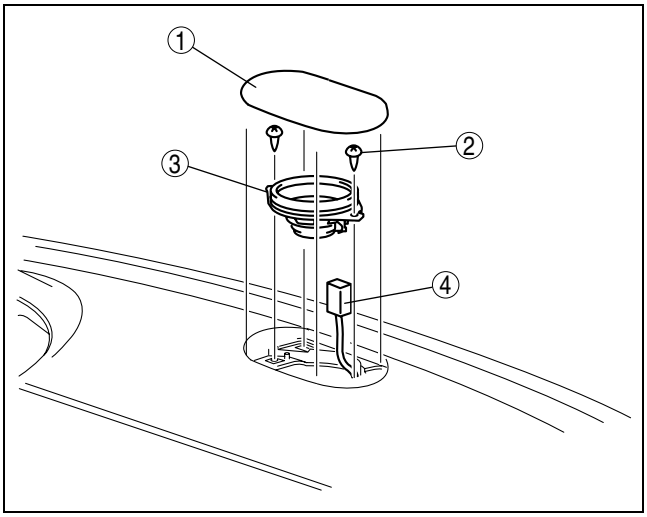
### CENTER SPEAKER REMOVAL/INSTALLATION

id092000806000

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Cover |
| 2 | Screw |
| 3 | Speaker |
| 4 | Connector |

3. Install in the reverse order of removal.




acxuuw00001815

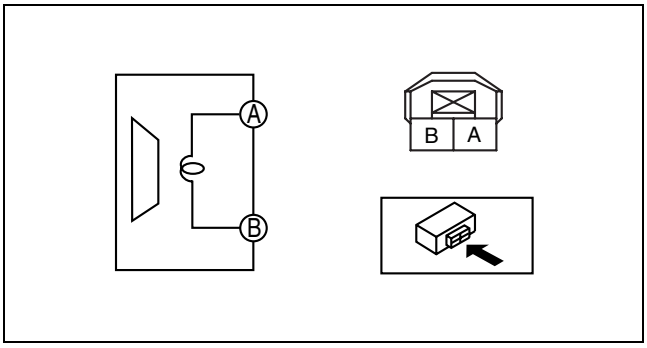
### CENTER SPEAKER INSPECTION

id092000806100

1. Verify the resistance between center speaker terminals.
   - If the resistance is not within the specification, replace the center speaker.

   **Resistance**
   **3.6 ohms**

2. Connect a **1.5 V** battery to the center speaker and verify that noise is heard from the center speaker.
   - If no noise is heard, replace the center speaker.




acxuuw00001810

## AUDIOPILOT MICROPHONE REMOVAL/INSTALLATION

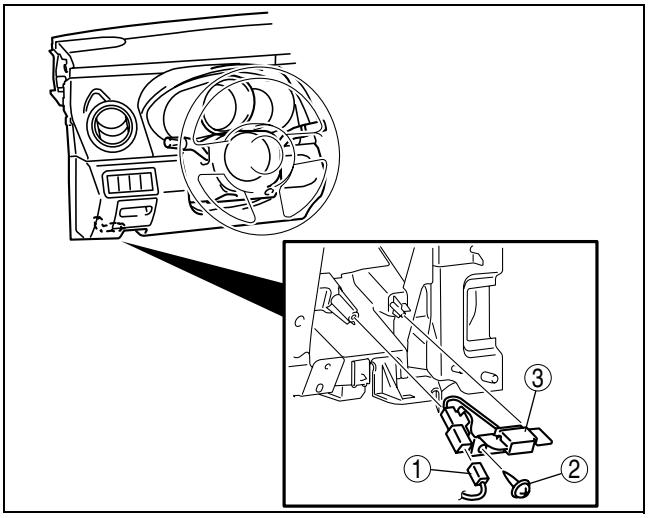
id092000806300

**Note**
- "AudioPilot" is a registered trademark of Bose Corporation.

1. Disconnect the negative battery cable.
2. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Screw |
| 3 | AudioPilot microphone |

3. Install in the reverse order of removal.




acxuuw00002282

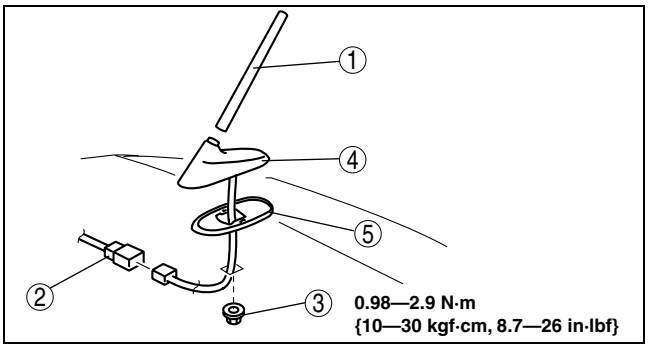
## CENTER ROOF ANTENNA REMOVAL/INSTALLATION

id092000801600

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Rear scuff plate inner (See 09-17-19 REAR SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Rear seat (See 09-13-7 REAR SEAT REMOVAL/INSTALLATION.)
   (3) Sub trunk box (See 09-17-25 SUB TRUNK BOX REMOVAL/INSTALLATION.)
   (4) Trunk end trim (See 09-17-24 TRUNK END TRIM REMOVAL/INSTALLATION.)
   (5) Trunk side trim (See 09-17-24 TRUNK SIDE TRIM REMOVAL/INSTALLATION.)
   (6) C-pillar trim (See 09-17-17 C-PILLAR TRIM REMOVAL/INSTALLATION.)
   (7) D-pillar trim (See 09-17-18 D-PILLAR TRIM REMOVAL/INSTALLATION.)
   (8) Assist handle (See 09-17-27 ASSIST HANDLE REMOVAL/INSTALLATION.)
3. Partially peel back the headliner.
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Antenna rod |
| 2 | Connector |
| 3 | Nut |
| 4 | Center roof antenna |
| 5 | Rubber |

5. Install in the reverse order of removal.
6. After installation, verify that the rubber of the center roof antenna is installed to the roof panel with no space between them.

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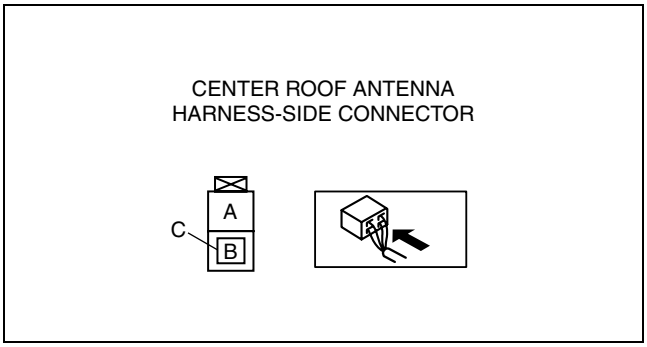
## CENTER ROOF ANTENNA INSPECTION

id092000801700

**Note**
- The center roof antenna has a built-in antenna amplifier.

### Antenna Amplifier Inspection

1. Turn the audio unit on and select the radio, then measure the voltage at center roof antenna connector terminal A.
- If the voltage is B+, go to the Feeder Line Inspection.
- If the voltage is not B+, inspect the audio unit or antenna feeder.

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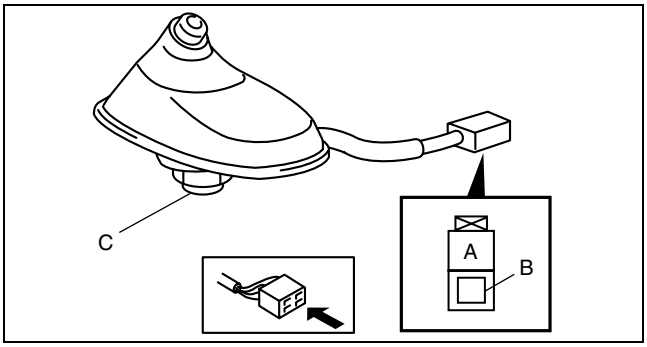
### Feeder Line Inspection

1. Verify that there is no continuity between the center roof antenna terminals A and C using an ohmmeter.
2. Inspect for continuity between the center roof antenna terminals using an ohmmeter.
   - If not as indicated in the table, replace the center roof antenna.

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○—○: Continuity

| Test condition | Terminal | | | Body GND |
|---|---|---|---|---|
| | A | B | C | |
| Under any condition | | ○ | ○ | ○ |

acxuuw00002201

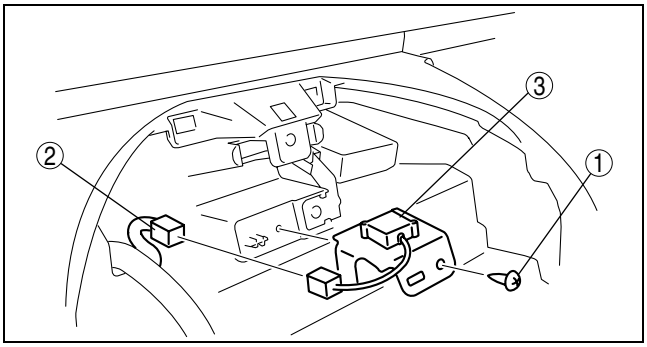
## GPS ANTENNA REMOVAL/INSTALLATION

id092000801500

1. Disconnect the negative battery cable.
2. Remove the meter hood. (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
3. Remove the instrument cluster. (See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | GPS antenna |

5. Install in the reverse order of removal.

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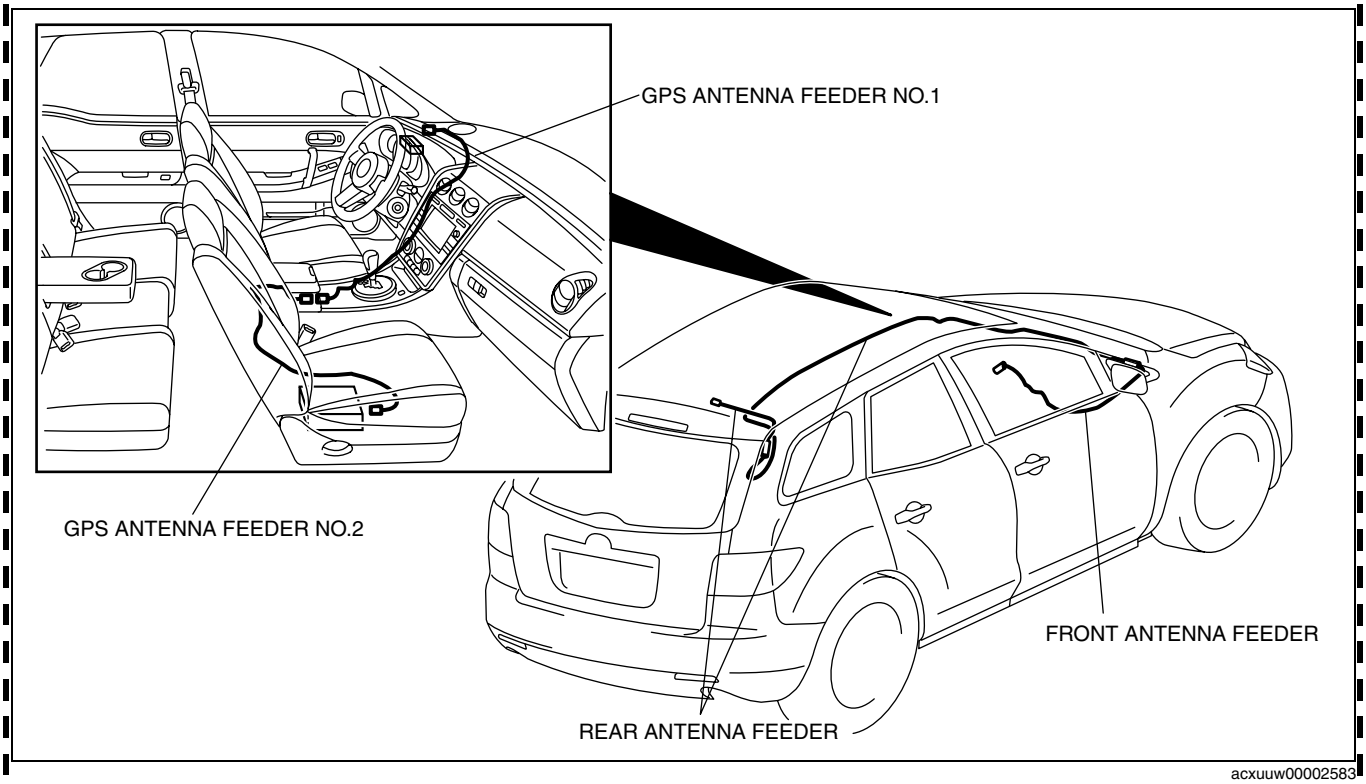
## ANTENNA FEEDER LOCATION

id092000801800

**Caution**
- **If the antenna feeder is installed with tension on the cable and wiring harness it could result in loosening of the connection areas and poor contact. When installing and connecting the antenna feeder, always make sure there is slack on the cable and wiring harness.**

**Note**
- The antenna feeder is integrated with the vehicle wiring harness.
- When installing a new antenna feeder, secure it to the vehicle wiring harness along the installation route of the old antenna feeder.

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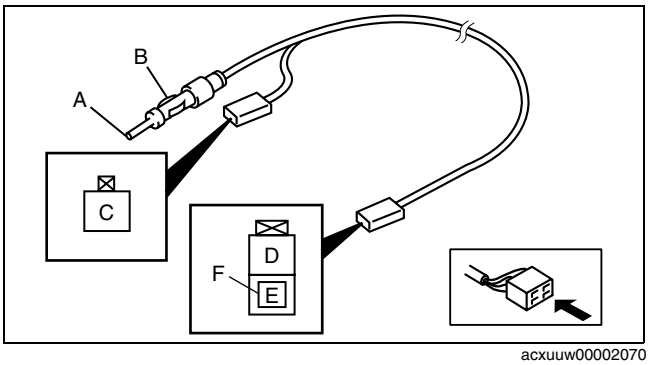
## FRONT ANTENNA FEEDER INSPECTION

id092000801900

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the front antenna feeder.




acxuuw00002070

○—○ : Continuity

| Test condition | Terminal | | | | | |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| Under any condition | ○ | | | | ○ | |
| | | ○ | | | | ○ |
| | | | ○ | ○ | | |

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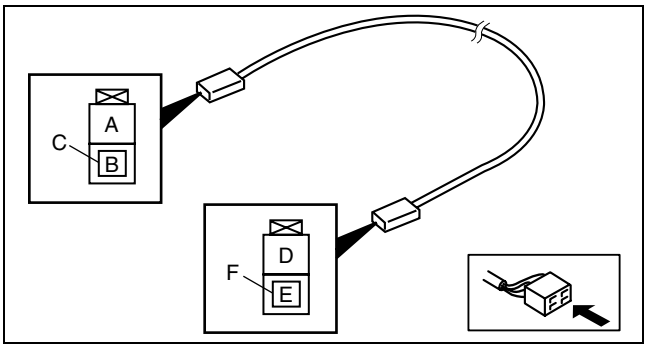
## REAR ANTENNA FEEDER INSPECTION

id092000802000

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the rear antenna feeder.




acxuuw00002072

○—○ : Continuity

| Test condition | Terminal | | | | | |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| Under any condition | ○ | | | ○ | | |
| | | ○ | | | ○ | |
| | | | ○ | | | ○ |

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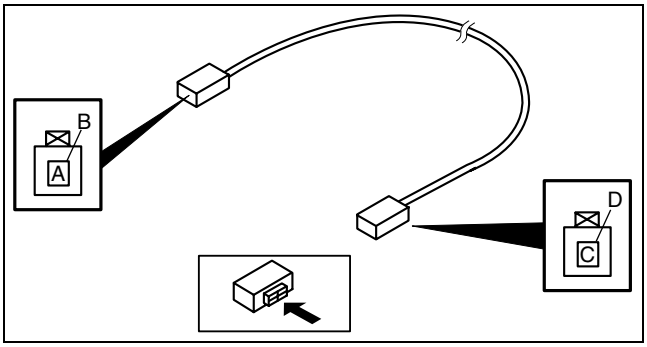
## GPS ANTENNA FEEDER INSPECTION

id092000802100

### GPS Antenna Feeder No.1

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the GPS antenna feeder No.1.

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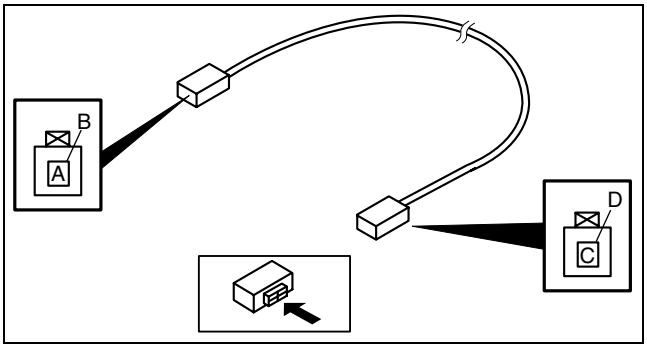
○—○ : Continuity

| Step | Terminal | | | |
|---|---|---|---|---|
| | A | B | C | D |
| 1 | ○ | | ○ | |
| 2 | | ○ | | ○ |

acxuuw00002286

### GPS Antenna Feeder No.2

1. Verify that the continuity is as indicated in the table.
   - If not as indicated in the table, replace the GPS antenna feeder No.2.

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○—○ : Continuity

| Step | Terminal | | | |
|---|---|---|---|---|
| | A | B | C | D |
| 1 | ○ | | ○ | |
| 2 | | ○ | | ○ |

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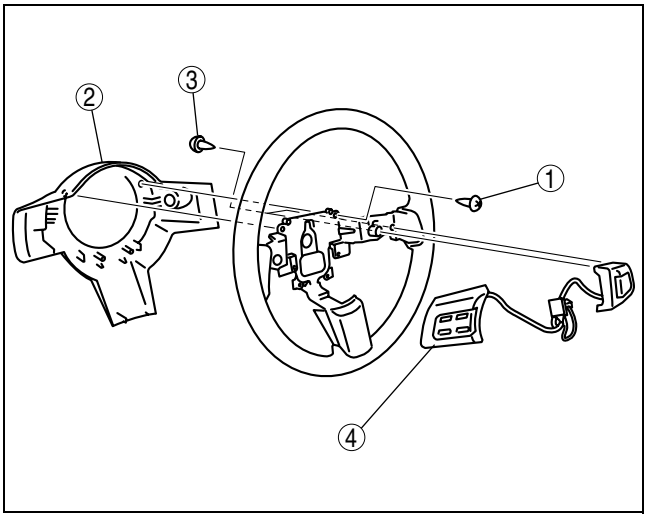
## AUDIO CONTROL SWITCH REMOVAL/INSTALLATION

id092000800200

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Remove the steering wheel. (See 06-14-6 STEERING WHEEL AND COLUMN REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw A |
| 2 | Cover |
| 3 | Screw B |
| 4 | Audio control switch |

5. Install in the reverse order of removal.

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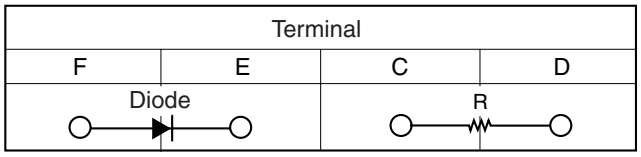
## AUDIO CONTROL SWITCH INSPECTION

id092000800300

1. Disconnect the negative battery cable.
2. Remove the driver-side air bag module. (See 08-10-6 DRIVER-SIDE AIR BAG MODULE REMOVAL/INSTALLATION.)
3. Disconnect the audio control switch connector.
4. Verify the resistance and continuity between the audio control switch terminals.
   - If the resistance and continuity are not as indicated in the tables, replace the audio control switch.

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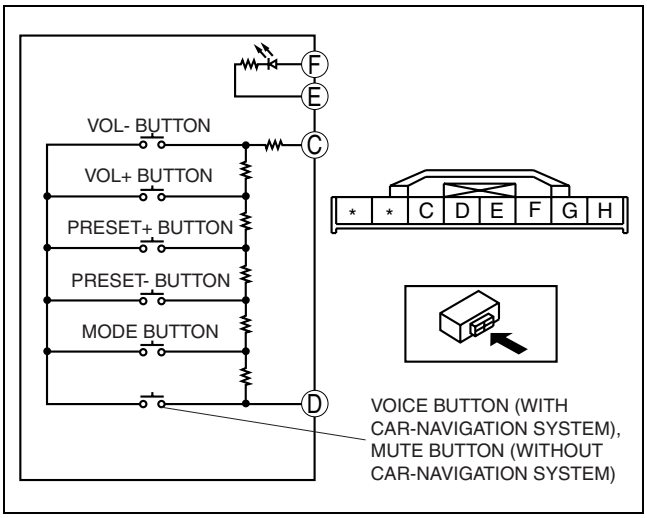
R: : Resistance.See the table.

| Switch position | Resistance (ohm) |
|---|---|
| VOL- button ON | 51— 56 |
| VOL+ button ON | 140— 154 |
| PRESET+ button ON | 286— 316 |
| PRESET- button ON | 533— 590 |
| MODE button ON | 984— 1,089 |
| MUTE button ON | 1,934— 2,139 |
| OFF | 4,794— 5,300 |




acxuuw00001263

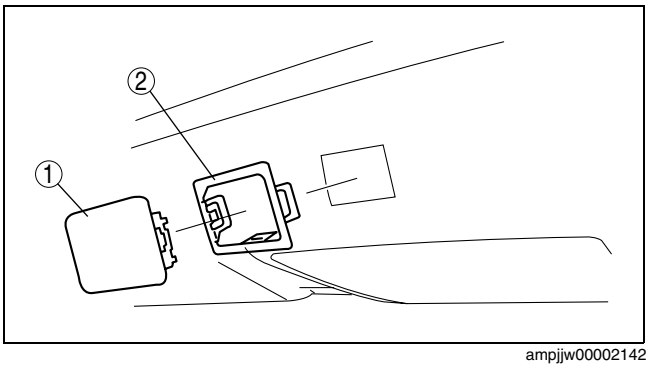
## MICROPHONE REMOVAL/INSTALLATION

id092000801400

1. Disconnect the negative battery cable.
2. Remove the map light. (See 09-18-22 MAP LIGHT REMOVAL/INSTALLATION.)
3. Disconnect the connector.
4. Remove in the order in the table.

| | |
|---|---|
| 1 | Microphone |
| 2 | Bracket |

5. Install in the reverse order of removal.

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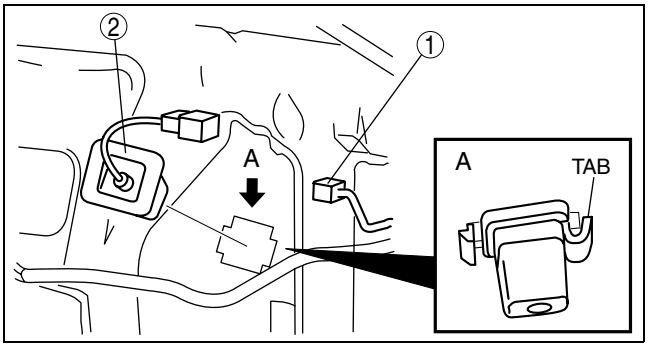
## REAR MOUNT CAMERA REMOVAL/INSTALLATION

id092000805900

1. Remove the liftgate upper trim. (See 09-17-25 LIFTGATE UPPER TRIM REMOVAL/INSTALLATION.)
2. Remove the liftgate side trim. (See 09-17-25 LIFTGATE SIDE TRIM REMOVAL/INSTALLATION.)
3. Remove the liftgate lower trim. (See 09-17-26 LIFTGATE LOWER TRIM REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Rear mount camera |

5. Install in the reverse order of removal.

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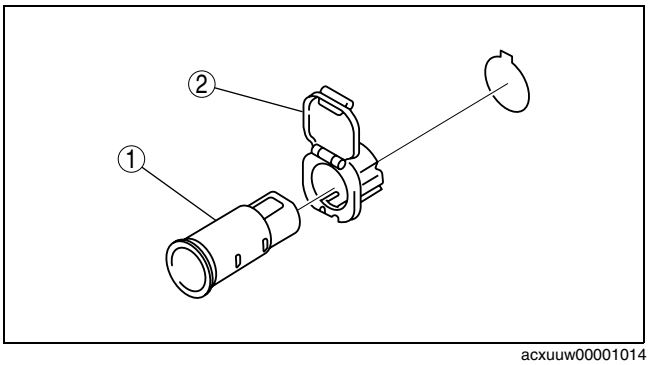
## ACCESSORY SOCKET REMOVAL/INSTALLATION

id092000800400

1. Disconnect the negative battery cable.
2. Remove the console panel. (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
3. Remove the console. (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Accessory socket<br>(See 09-20-15 Accessory Socket Removal Note.) |
| 2 | Cap<br>(See 09-20-15 Cap Removal Note.) |

5. Install in the reverse order of removal.

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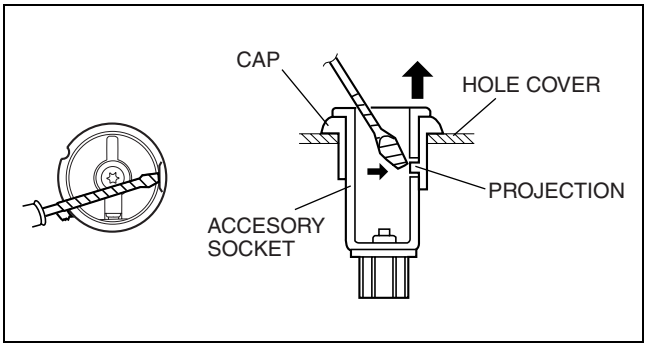
**Accessory Socket Removal Note**

1. While pressing a tape-wrapped flathead screwdriver against the cap projection, pull the accessory socket outward.

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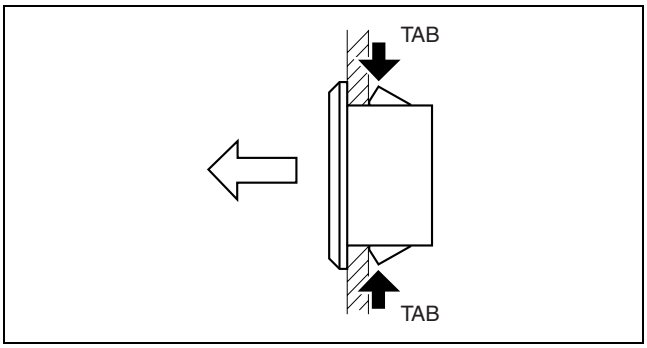
**Cap Removal Note**

1. While pressing the tabs, pull the cap outwards.

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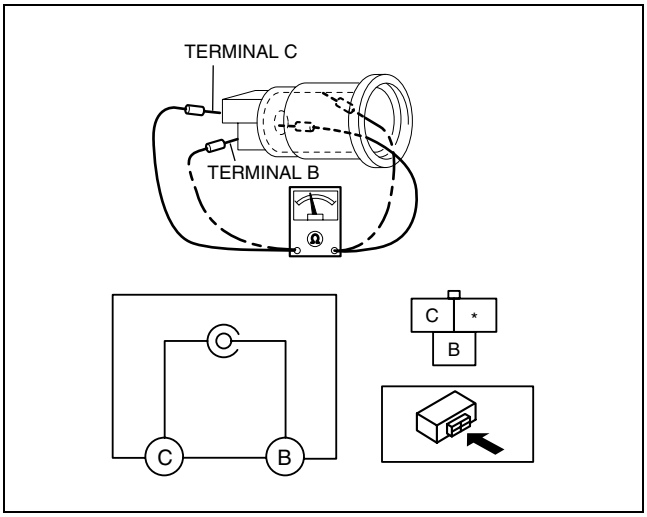
**ACCESSORY SOCKET INSPECTION**

id092000800500

1. Connect a tester as shown in the figure and verify that there is continuity.
   - If the continuity cannot be verified, replace the accessory socket.

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# 09-21 POWER SYSTEMS

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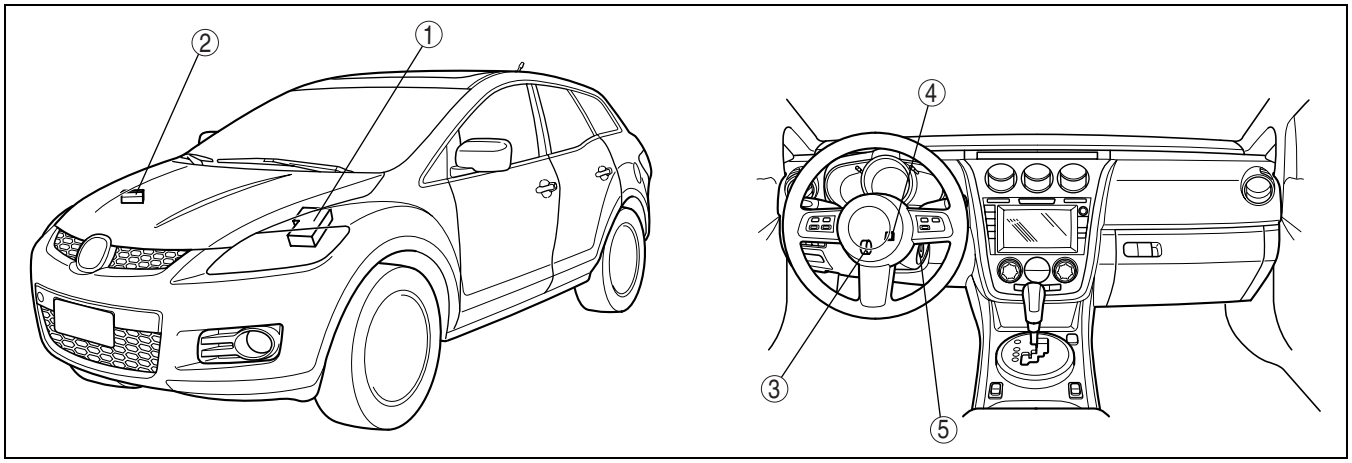
id092100800700




acxuuw00002092

| | |
|---|---|
| 1 | Main fuse block<br>(See 09-21-4 RELAY LOCATION.)<br>(See 09-21-4 RELAY INSPECTION.) |
| 2 | Relay block<br>(See 09-21-4 RELAY LOCATION.)<br>(See 09-21-4 RELAY INSPECTION.) |
| 3 | Ignition switch<br>(See 09-21-2 IGNITION SWITCH REMOVAL/INSTALLATION)<br>(See 09-21-2 IGNITION SWITCH INSPECTION.) |
| 4 | Key reminder switch<br>(See 09-21-2 KEY REMINDER SWITCH REMOVAL/INSTALLATION)<br>(See 09-21-3 KEY REMINDER SWITCH INSPECTION.) |
| 5 | Steering lock unit<br>(See 09-21-3 STEERING LOCK UNIT INSPECTION.) |

## FUSE SERVICE CAUTIONS

id092100800400

**Caution**

- **Determine and correct the cause of the burnt fuse before replacing it with the specified type. If the fuse is replaced before doing this, it may burn again.**

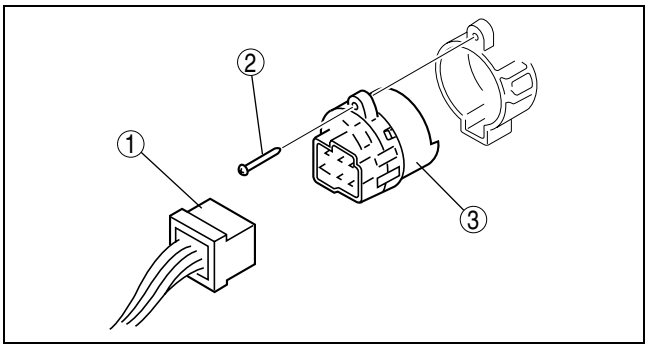
## IGNITION SWITCH REMOVAL/INSTALLATION

id092100800200

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Screw |
| 3 | Ignition switch |

4. Install in the reverse order of removal.

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## IGNITION SWITCH INSPECTION

id092100800100

1. Verify that the continuity between the ignition switch terminals is as indicated in the table.
   - If not as indicated in the table, replace the ignition switch.

○—○: Continuity

| Ignition key position | Terminal | | | | | |
|---|---|---|---|---|---|---|
| | E | F | D | C | B | A |
| LOCK | | | | | | |
| ACC | ○ | | ○ | | | |
| ON | ○ | | ○ | ○ | | |
| | | ○ | | | ○ | |
| START | ○ | | | ○ | | |
| | | ○ | | | | ○ |

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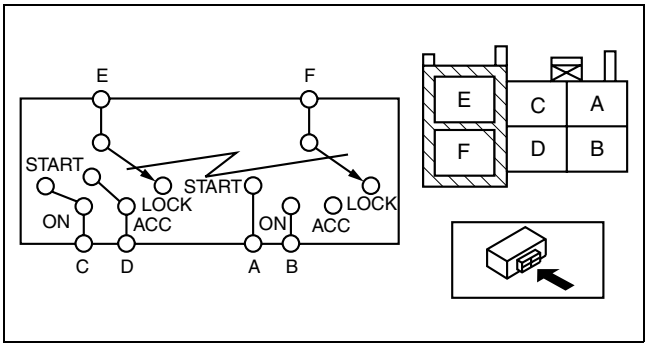


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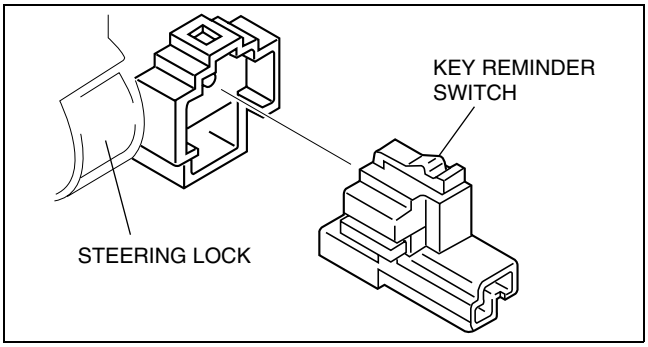
## KEY REMINDER SWITCH REMOVAL/INSTALLATION

id092100801000

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Disconnect the key reminder switch connector.
4. Remove the key reminder switch.
5. Install in the reverse order of removal.

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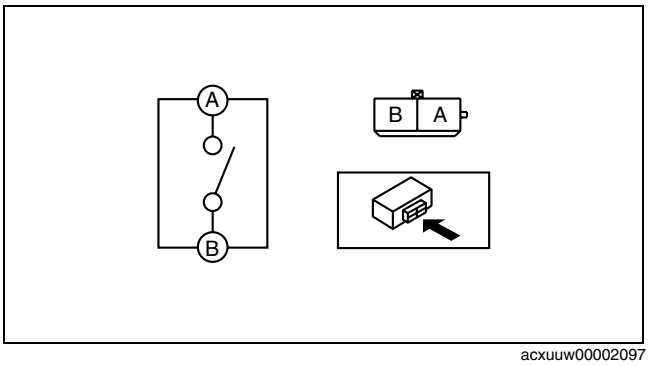
## KEY REMINDER SWITCH INSPECTION

id092100801100

1. Disconnect the negative battery cable.
2. Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
3. Disconnect the key reminder switch connector.
4. Inspect for continuity between the key reminder switch terminals using a tester.
   - If there is any malfunciton, replace the key reminder switch.

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○—○ : Continuity

| Key position | Terminal | |
|---|---|---|
| | A | B |
| Key inserted | ○ | ○ |
| Key removed | | |

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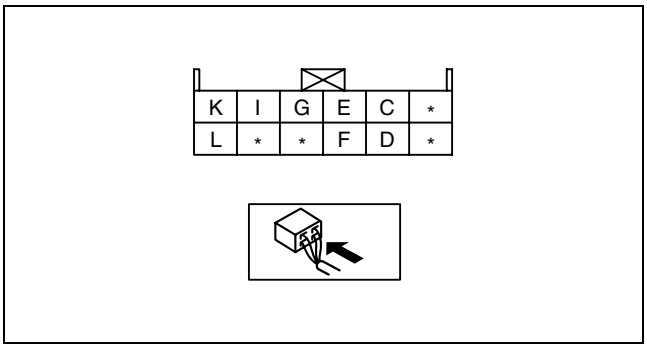
## STEERING LOCK UNIT INSPECTION

id092100800500

1. Measure the voltage or inspect for continuity according to the Terminal Voltage Table (Reference).
   - If the voltage is not as specified in the Terminal Voltage Table (Reference), inspect the parts under "Inspection item(s)" and related wiring harnesses.
2. If the system does not work properly even though the inspection items or related wiring harnesses do not have any malfunction, replace the steering look unit.

09-21

### Terminal Voltage Table (Reference)

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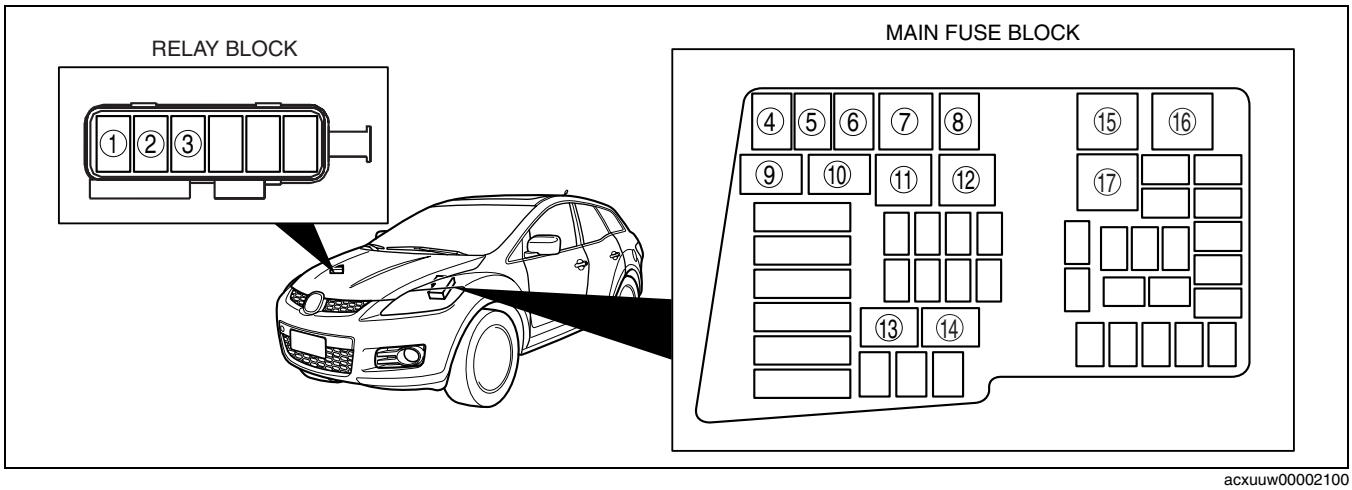
| Terminal | Signal name | Connected to | Measured condition | Voltage (V)/ Continuity | Inspection item(s) |
|---|---|---|---|---|---|
| E | Push switch signal | Keyless control module | Start knob pressed | B+ | • Keyless control module<br>• Related wiring harnesses |
| | | | Start knob released | 1.0 or less | |
| F | Power supply | Fuse | Under any condition | B+ | • Fuse<br>• Related wiring harnesses |
| G | Key reminder switch signal | Keyless control module | Key inserted | B+ | • Keyless control module<br>• Related wiring harnesses |
| | | | Key removed | 1.0 or less | |
| I | Power supply | Fuse | Under any condition | B+ | • Fuse<br>• Related wiring harnesses |
| K | Serial communication | Keyless control module | Under any condition: Inspect for continuity to keyless control module. | Continuity detected | Related wiring harnesses |
| L | GND | Body ground | Under any condition: Inspect for continuity to GND. | Continuity detected | Related wiring harnesses |

## RELAY LOCATION

id092100800600

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| | |
|---|---|
| 1 | Horn relay |
| 2 | A/C relay |
| 3 | Front fog light relay |
| 4 | Rear window defroster relay |
| 5 | TNS relay |
| 6 | Drive-by-wire relay |
| 7 | Headlight relay |
| 8 | Back-up light relay |
| 9 | Fuel pump relay |

| | |
|---|---|
| 10 | Starter relay No.2 |
| 11 | Cooling fan relay No.2 |
| 12 | Blower relay |
| 13 | Fuel pump speed control relay |
| 14 | Injector relay |
| 15 | Starter relay No.1 |
| 16 | Main relay |
| 17 | Cooling fan relay No.1 |

## RELAY INSPECTION

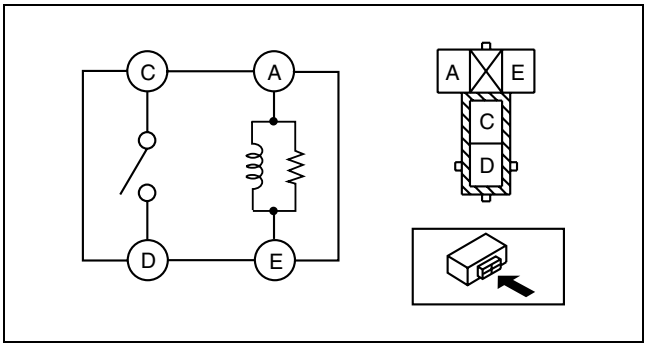
id092100800300

### Relay type

| Terminal type | | Part name |
|---|---|---|
| 4 terminals | Type A | • Fuel pump relay<br>• Fuel pump speed control relay<br>• Starter relay No.2<br>• Injector relay<br>• Drive-by-wire relay<br>• A/C relay<br>• Rear window defroster relay<br>• TNS relay<br>• Front fog light relay<br>• Back-up light relay<br>• Horn relay |
| | Type B | • Cooling fan relay No.1<br>• Cooling fan relay No.2<br>• Starter relay No.1<br>• Main relay<br>• Blower relay<br>• Headlight relay |

**Type A**

1. Verify the continuity between the relay terminals.
   - If not as indicated in the table, replace the relay.

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○—○ : Continuity

| Step | Terminal | | | |
|---|---|---|---|---|
| | A | E | C | D |
| 1 | ○ | ○ | | |
| 2 | B+ | GND | ○ | ○ |

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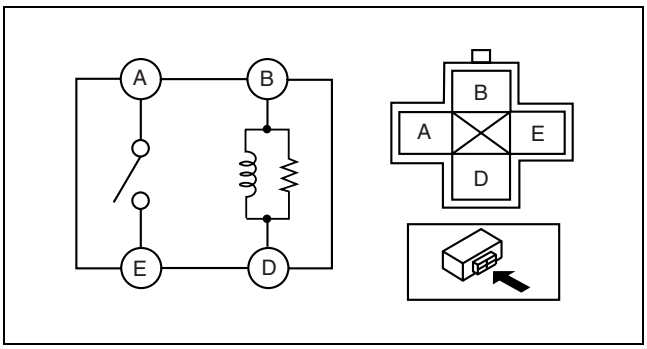
**Type B**

1. Verify the continuity between the relay terminals.
   - If not as indicated in the table, replace the relay.

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○—○ : Continuity

| Step | Terminal | | | |
|---|---|---|---|---|
| | B | D | A | E |
| 1 | ○ | ○ | | |
| 2 | B+ | GND | ○ | ○ |

acxuuw00002121

# 09-22 INSTRUMENTATION/DRIVER INFO.


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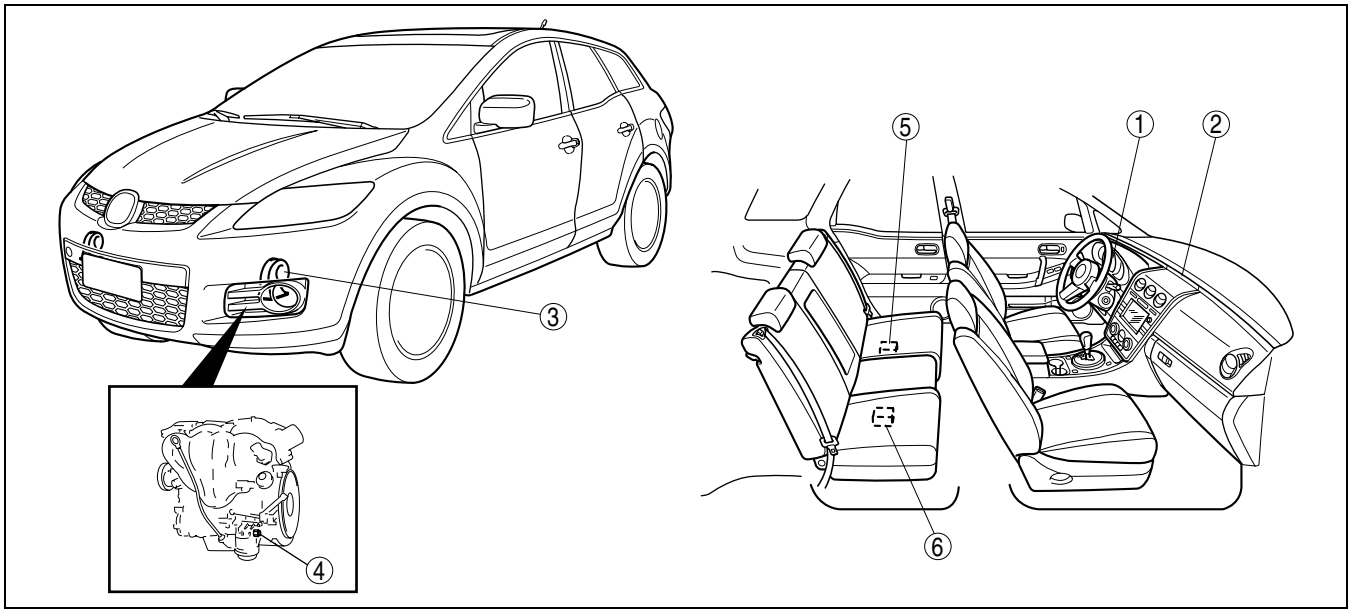
## INSTRUMENTATION/DRIVER INFO. LOCATION INDEX

id092200801000

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| | |
|---|---|
| 1 | Instrument cluster<br>(See 09-22-2 INSTRUMENT CLUSTER REMOVAL/INSTALLATION)<br>(See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION)<br>(See 09-22-3 INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY)<br>(See 09-22-3 INSTRUMENT CLUSTER INSPECTION)<br>(See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE) |
| 2 | Information display<br>(See 09-22-15 INFORMATION DISPLAY REMOVAL/INSTALLATION)<br>(See 09-22-15 INFORMATION DISPLAY INPUT/OUTPUT CHECK MODE) |
| 3 | Horn<br>(See 09-22-14 HORN REMOVAL/INSTALLATION) |
| 4 | Oil pressure switch<br>(See 09-22-14 OIL PRESSURE SWITCH INSPECTION) |
| 5 | Fuel gauge sender unit<br>(See 09-22-14 FUEL GAUGE SENDER UNIT INSPECTION) |
| 6 | Fuel gauge sender sub-unit (AWD)<br>(See 09-22-12 FUEL GAUGE SENDER UNIT REMOVAL/INSTALLATION[AWD])<br>(See 09-22-14 FUEL GAUGE SENDER UNIT INSPECTION) |

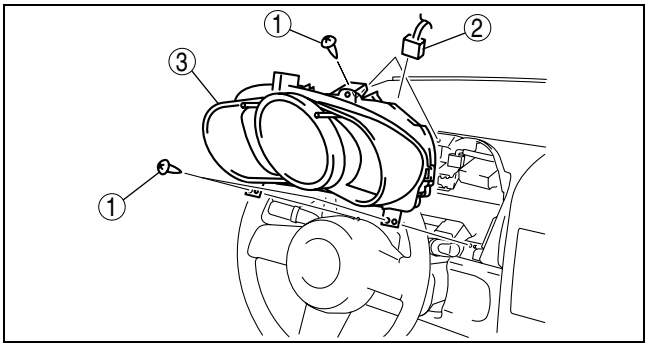
## INSTRUMENT CLUSTER REMOVAL/INSTALLATION

id092200800500

**Caution**
- **When replacing the instrument cluster, the configuration procedure must be performed before removing the instrument cluster. Replacing the instrument cluster without performing the configuration procedure will result in system malfunction.**

1. Perform the instrument cluster configuration when replacing it. (See 09-22-3 INSTRUMENT CLUSTER CONFIGURATION.)
2. Disconnect the negative battery cable.
3. Remove the following parts:
   (1) Front scuff plate inner (driver's side) (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (driver's side) (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
   (7) Meter hood (See 09-17-10 METER HOOD REMOVAL/INSTALLATION.)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | Instrument cluster |



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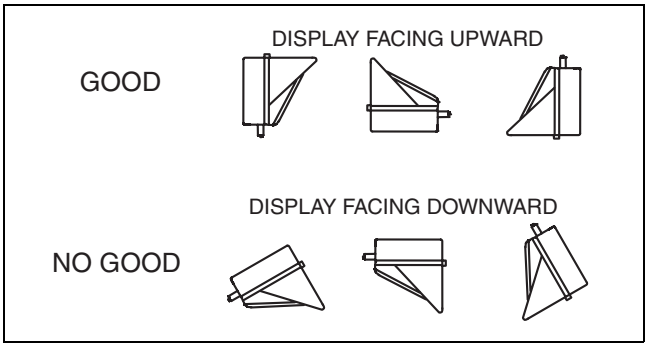
5. Install in the reverse order of removal.
6. When replacing the instrument cluster of vehicles with the immobilizer system, perform the following procedure:
   - See 09-14-20 IMMOBILIZER SYSTEM COMPONENT REPLACEMENT/KEY ADDITION AND CLEARING[KEYLESS ENTRY SYSTEM].

**Caution**
- **The removed instrument cluster should be placed with the display side up to prevent grease from leaking from the meters.**



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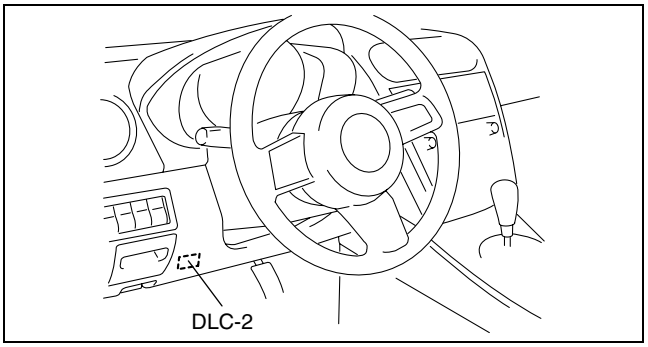
## INSTRUMENT CLUSTER CONFIGURATION

id092200800300

**Note**
- The odometer data (total traveled distance) in the previous instrument cluster is automatically transferred to a new instrument cluster during the configuration.

1. Connect the M-MDS to the DLC-2 (16-pin).
2. After set up the M-MDS (including the vehicle recognition), the following can be selected from the M-MDS screen.
   **Using an IDS (Notebook PC):**
   - "Module Programming"
   **Using a PDS (Pocket PC):**
   - "Programming", "Module Programming"
3. Select “Programmable Module Installation”.
4. Select “HEC” and perform procedures according to directions on the M-MDS screen.
5. Retrieve DTCs using the M-MDS and verify that there is no DTC present.
   - If any DTC is present, perform applicable DTC inspection. (See 09-02E-1 DTC TABLE[INSTRUMENT CLUSTER].)



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## INSTRUMENT CLUSTER DISASSEMBLY/ASSEMBLY

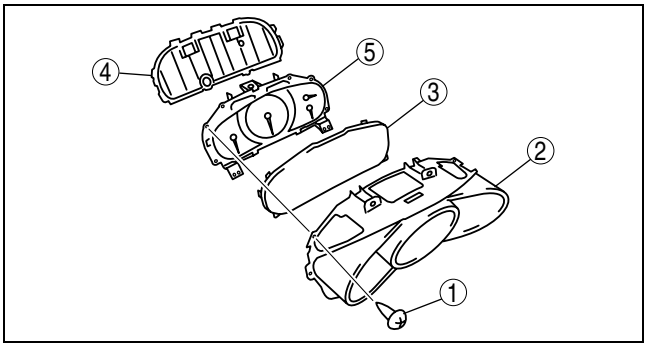
id092200801600

**Caution**
- **Do not drop the instrument cluster or damage the printed board. This will lead to a system malfunction.**

1. Disassemble in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Cover |
| 3 | Lens |
| 4 | Instrument cluster unit |

2. Assemble in the reverse order of disassembly.



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## INSTRUMENT CLUSTER INSPECTION

id092200800400

**Speedometer**
**Using the input/output check mode**
1. Inspect the speedometer by setting it to check code 12 of the input/output check mode. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

**Using a speedometer tester**
1. Adjust the tire pressure to the specification.
2. Using a speedometer tester, verify that the tester reading is as indicated in the table below.

| Speedometer tester indication (km/h) | Allowable range (km/h) |
|---|---|
| 20 | 18— 22 |
| 40 | 38— 41 |
| 60 | 58— 62 |
| 80 | 78— 82 |
| 100 | 97— 102 |
| 120 | 117— 122 |
| 140 | 136— 142 |

| Speedometer tester indication (mph) | Allowable range (mph) |
|---|---|
| 10 | 8.6— 11 |
| 20 | 19— 21 |
| 30 | 29— 31 |
| 40 | 39— 41 |
| 50 | 49— 51 |
| 60 | 59— 61 |
| 70 | 68— 72 |
| 80 | 78— 82 |

3. Verify that the speedometer reading is within the range indicated in the table.
   - If the speedometer does not move or the indication is not within the allowable range, inspect the PCM and related wiring harnesses.
     — If the PCM and related wiring harnesses are normal, replace the instrument cluster.

**Tachometer**

**Using the input/output check mode**

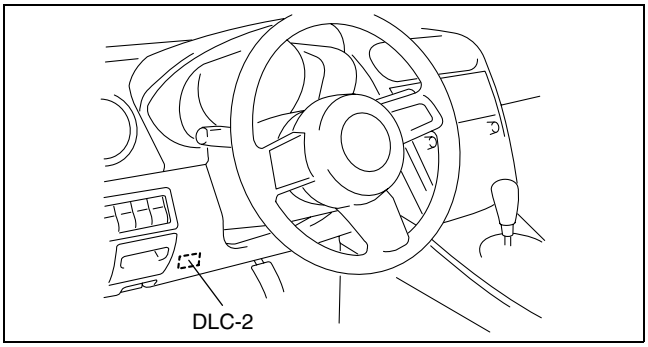
1. Inspect the tachometer by setting it to check code 13 of the input/output check mode. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

**Using M-MDS**

**Caution**
- **If the engine speed exceeds the allowable range, the engine could be damaged. Therefore, when inspecting the tachometer, do not allow the engine speed to exceed the allowable range indication on the tachometer.**

1. Connect the M-MDS to the DLC-2 (16-pin).
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   **When using the IDS (notebook PC)**
   - Select the “Toolbox” tab.
   - Select “DataLogger”.
   - Select “Module”.
   - Select “HEC”.

   **When using the PDS (pocket PC)**
   - Select “Module Tests”.
   - Select “HEC”.
   - Select “DataLogger”.
3. Compare the data monitor item (IC_TACHO) with the tachometer indication.
   - If the tachometer does not operate properly, inspect the PCM and related wiring harnesses.
     — If the PCM and related harnesses do not have any malfunction, replace the instrument cluster.



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**Fuel gauge**

1. Inspect the fuel gauge by setting it to check code 23 of the input/output check mode. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

**Water temperature gauge**

1. Inspect the water temperature gauge by setting it to check code 25 of the input/output check mode. (See 09-22-5 INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE.)

## INSTRUMENT CLUSTER INPUT/OUTPUT CHECK MODE

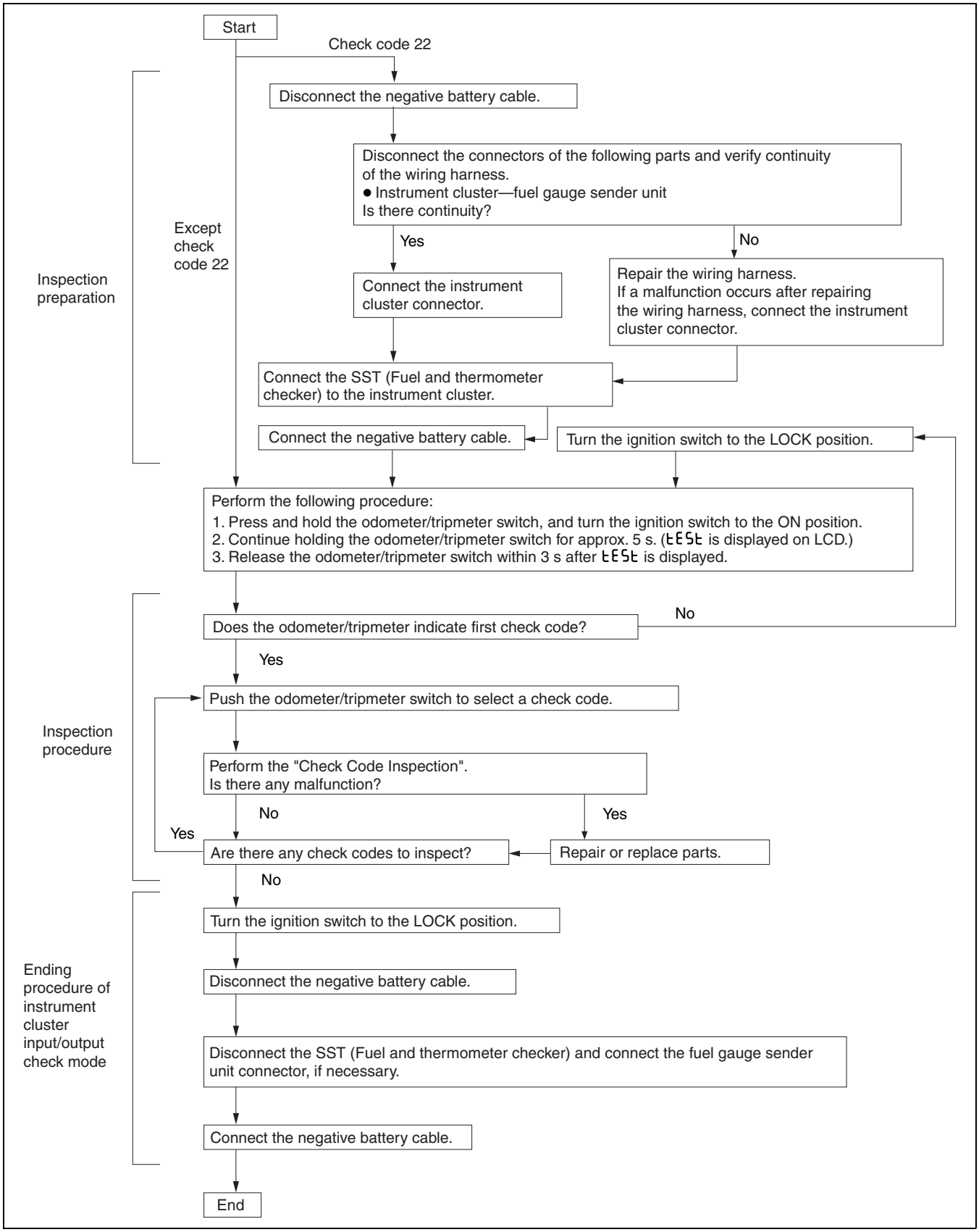
id092200801700

**Note**
- In this mode, it is possible to verify the items in the following chart.

**Check Code Table**

| Check code | Check item | Related items |
|---|---|---|
| 08 | TNS relay | • Lights-on reminder warning alarm<br>• Each illumination light |
| 12 | Speedometer | Speedometer |
| 13 | Tachometer | Tachometer |
| 14 | Buzzer | Buzzer |
| 16 | Fuel-level warning light | Fuel-level warning light |
| 22 | Fuel gauge sender unit | Fuel gauge |
| 23 | Fuel gauge | Fuel gauge |
| 25 | Water temperature gauge | Water temperature gauge |
| 26 | • Odometer/tripmeter (LCD)<br>• Warning and indicator light | • Odometer/tripmeter (LCD)<br>• Warning and indicator light |
| 55 | Panel light control switch (dimmer switch) | Panel light control switch (dimmer switch) |
| 57 | Panel light control | Illumination light bulb |
| 59 | • CAN system<br>• Fuel gauge sender unit | • CAN system<br>• Fuel system |

**Note**
- Check codes which are not listed may be indicated, but they cannot be inspected.
- The check codes are displayed in numerical order. (While performing the inspection, if you want to inspect a check code with a number smaller than the code number you are currently inspecting, terminate the check mode then repeat the inspection from the beginning.)
- If a speed signal is input to the instrument cluster (the wheels are rotated), the input/output check mode will be cancelled.
- The check codes can be fast-forwarded by pushing and holding the odometer/tripmeter switch for **1 s or more**.

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### Checking Order

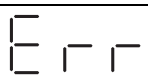
**Note**
- When inspecting more than two check codes, begin with the code with the highest ranking.

| Priority order of inspection | Check code |
|---|---|
| 1 | 22 |
| 2 | 08, 12, 13, 14, 16, 23, 25, 26, 55, 57, 59 |

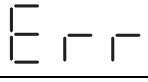
### Check Code Inspection
### Check code 08

| Check code 08 | TNS relay ON/OFF signal | | |
|---|---|---|---|
| **STEP** | **INSPECTION CONDITION** | **DISPLAY** | **ACTION** |
| 1 | Turn the headlight switch to the TNS position. (TNS relay ON) | | Go to the next step. |
| | | | Verify that the voltage of instrument cluster terminal 2I is **B+**.<br>• If the voltage is as specified, replace the instrument cluster.<br>• If the voltage is not as specified, inspect the following parts:<br>— TNS relay<br>— Wiring harness (Battery— TNS relay— instrument cluster) |
| 2 | Turn the headlight switch off. (TNS relay OFF) | | Verify that the voltage of the instrument cluster terminal 2I is **1.0 V or less**.<br>• If the voltage is as specified, replace the instrument cluster.<br>• If the voltage is not as specified, inspect the following parts:<br>— TNS relay<br>— Wiring harness (TNS relay— instrument cluster) |
| | | | Input signal to the instrument cluster is normal. |

### Check code 12

| Check code 12 | Speedometer display signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| After selecting check code 12, wait for **approx. 2 s**. | | The speedometer needle moves full scale then returns to **approx. 60 km/h**. | The speedometer is normal. |
| | | Except above | Replace the instrument cluster. |
| |  | — | |

### Check code 13

| Check code 13 | Tachometer operation signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| After selecting check code 13, wait for **approx. 2 s**. | | The tachometer needle moves full scale then returns to **approx. 3,000 rpm**. | The tachometer is normal. |
| | | Except above | Replace the instrument cluster. |
| |  | — | |

**Check code 14**

| Check code 14 | Buzzer operation signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| After selecting check code 14, wait **approx. 2 s**. | 01 | The buzzer sounds. | The buzzer is normal. |
| | | The buzzer does not sound. | Replace the instrument cluster. |

**Check code 16**

| Check code 16 | Fuel-level warning light flashing signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| After selecting check code 16, wait **approx. 2 s**. | 01<br>(FLASHING) | Fuel-level warning light flashes **three times**. | The fuel-level warning light is normal. |
| | | Except above | Replace the instrument cluster. |

**Check code 22**

| Check code 22 | Fuel level signal | | |
|---|---|---|---|
| **STEP** | **INSPECTION CONDITION** | **DISPLAY** | **ACTION** |
| 1 | Select check code 22 with the fuel gauge sender unit connector disconnected. | 162<br>↓<br>255 | Go to the next step. |
| | | Except above | Go to the Step 6. |
| 2 | Connect terminals 2U and 2W of the instrument cluster. | 010<br>↓<br>003 | Go to the next step. |
| | | Except above | Go to the Step 6. |
| 3 | Using the **SST** (Fuel and thermometer checker) or resistor, input **20 ohms** between instrument cluster terminals 2U and 2W. | 017<br>↓<br>023 | Go to the next step. |
| | | Except above | Go to the Step 6. |
| 4 | Using the **SST** (Fuel and thermometer checker) or resistor, input **60 ohms** between instrument cluster terminals 2U and 2W. | 057<br>↓<br>063 | Go to the next step. |
| | | Except above | Go to the Step 6. |
| 5 | Using the **SST** (Fuel and thermometer checker) or resistor, input **100 ohms** between instrument cluster terminals 2U and 2W. | 097<br>↓<br>103 | Inspect the fuel gauge sender unit. |
| | | Except above | Go to the next step. |

| Check code 22 | Fuel level signal | | |
|---|---|---|---|
| **STEP** | **INSPECTION CONDITION** | **DISPLAY** | **ACTION** |
| 6 | Inspect the wiring harness and connector between instrument cluster and fuel gauge sender unit.<br>• If there is any malfunction, repair or replace the wiring harness or connector.<br>• If there is no malfunction, replace the instrument cluster. | | |

**Check code 23**

| Check code 23 | Fuel gauge operation signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| After selecting check code 23, wait **approx. 2 s**. | | The fuel gauge indicates status in the following order **approx. every 2 s**.<br>• F → 1/2 → E → F (fixed) | The fuel gauge is normal. |
| | | Except above | Replace the instrument cluster. |
| | | Replace the instrument cluster. | |

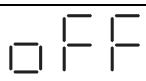
**Check code 25**

| Check code 25 | Water temperature gauge operation signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| After selecting check code 25, wait approx. **2 s**. | | The water temperature gauge indicates status in the following order **approx. every 2 s**.<br>• H → Center → C → H (fixed) | The water temperature gauge is normal. |
| | | Except above | Replace the instrument cluster. |
| | | Replace the instrument cluster. | |

**Check code 26**

| Check code 26 | Odometer/tripmeter display signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| Select check code 26. | | • Display is normal.<br>• Warning and indicator light illuminated.<br>— Generator warning light<br>— DSC/TCS indicator light<br>— ABS warning light<br>— Brake system warning light<br>— Cruise set indicator light<br>— Cruise main indicator light<br>— TCS OFF light<br>— Selector indicator light<br>— Door ajar warning light<br>— Seat belt warning light<br>— Air bag system warning light<br>— Turn indicator light<br>— Oil pressure warning light<br>— MIL<br>— Keyless indicator light<br>— Keyless warning light<br>— Security light<br>— AT warning light | • The odometer/tripmeter is normal.<br>• Warning and indicator is normal. |
| | | Except above | Replace the instrument cluster. |

**Check code 55**

| Check code 55 | Dimmer switch ON/OFF signal | | |
|---|---|---|---|
| **STEP** | **INSPECTION CONDITION** | **DISPLAY** | **ACTION** |
| 1 | After selecting the check code 55, press and hold the dimmer switch. (Dimmer switch ON) | | Go to the next step. |
| | |  | Replace the instrument cluster. |
| 2 | Release the dimmer switch. (Dimmer switch OFF) | | Replace the instrument cluster. |
| | | | Input signal to the instrument cluster is normal. |

**Check code 57**

| Check code 57 | Panel light control signal | | |
|---|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** | |
| Turn the headlight switch to the TNS position.<br>After selecting check code 57, wait **approx. 2 s**. | <br>(FLASHING) | Illumination light (hazard warning switch, center panel unit, etc.) flashes **three times**. | The panel light control signal is normal. |
| | | Except above | Verify that the voltage of instrument cluster terminal 1F is **B+**.<br>• If the voltage is as specified, replace the instrument cluster.<br>• If the voltage is not as specified, inspect the following parts:<br>— Illumination light (hazard warning switch, center panel unit, etc.)<br>— Wiring harness (Instrument cluster— illumination lights— TNS relay) |

**Check code 59**
**Diagnostic procedure**

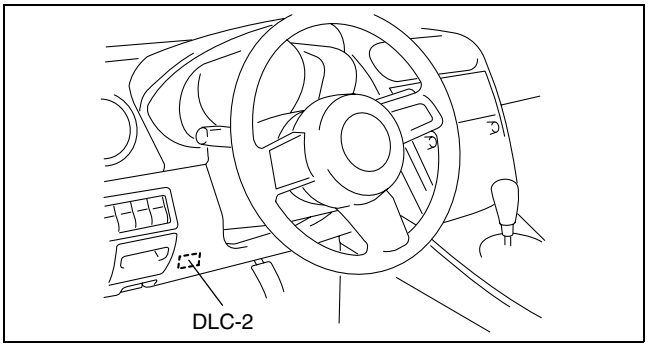
| Check code 59 | CAN system/fuel system | | |
|---|---|---|---|
| **STEP** | **INSPECTION** | **INDICATION** | **ACTION** |
| 1 | The three digits number is indicated after selecting check code 59. Confirm the first digit from the right. | First digit from the right<br> | The CAN system is okay.<br>Go to next step. |
| | | First digit from the right<br> | The DTC of CAN system is detected.<br>Perform the DTC inspection. (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM])<br>• If the CAN system is okay, replace the instrument cluster.<br>Go to next step. |
| 2 | Confirm the second digit from the right. | Second digit from the right<br> | The wiring harnesses between the fuel gauge sender unit and instrument cluster are okay.<br>Go to next step. |
| | | Second digit from the right<br> | Inspect following parts.<br>• Fuel gauge sender unit<br>• Wiring harness (Fuel gauge sender unit— instrument cluster)<br>— If fuel gauge sender unit and wiring harness are okay, replace the instrument cluster.<br>Go to next step. |
| 3 | Confirm the third digit from the right. | Third digit from the right<br> | The fuel pulse signal from the PCM is okay. |
| | | Third digit from the right<br> | Inspect the PCM.<br>(See01-02-7 ON-BOARD DIAGNOSTIC TEST[L3 WITH TC], 01-40-6 PCM INSPECTION[L3 WITH TC])<br>• If the PCM is okay, replace the instrument cluster. |

### DATA MONITORING AND RECORDING PROCEDURE

id092200801500

1. Connect the M-MDS or equivalent to the DLC-2 (16-pin).
2. After the vehicle is identified, select the following items from the initialization screen of the M-MDS.
   **When using the IDS (notebook PC)**
   - Select the “Toolbox” tab.
   - Select “DataLogger”.
   - Select “Module”.
   - Select “HEC”.

   **When using the PDS (pocket PC)**
   - Select “Module Tests”.
   - Select “HEC”.
   - Select “DataLogger”.
3. Verify the data monitor items.

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**Indication Item Table**

| Monitor item | Input-output signal/part name | Unit/State | Terminal |
|---|---|---|---|
| IC_DTC_CNT | Number of continuous DTCs | — | — |
| IC_ECT | Water temperature gauge | °C | 2R, 2T |
| IC_NUMKEYS | Number of key ID numbers registered with the vehicle | — | — |
| IC_ODO_CNT | Odometer | m | 2R, 2T |
| IC_SPDMTR | Speedometer | KPH | |
| IC_TACHO | Tachometer | RPM | |

### FUEL GAUGE SENDER UNIT REMOVAL/INSTALLATION[AWD]

id0922008019b4

**Fuel Gauge Sender Unit**

1. Remove the fuel gauge sender unit. (See 01-14-11 FUEL PUMP UNIT REMOVAL/INSTALLATION[L3 WITH TC])
2. Install in the reverse order of removal.

**Fuel Gauge Sender Sub-Unit**

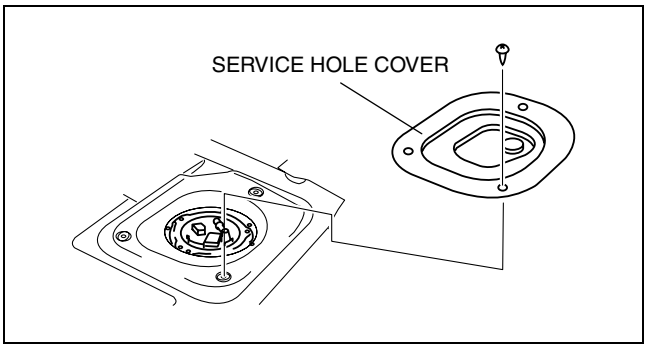
**Warning**

- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, always complete the “Fuel Line Safety Procedure”.**
- **Fuel line spills and leakage are dangerous. Fuel can ignite and cause serious injuries or death and damage. Fuel can also irritate skin and eyes. To prevent this, before performing the fuel pump unit removal/installation, always complete the “Fuel Leak Inspection After Fuel Pump Unit Installation”.**
- **A person charged with static electricity could cause a fire or explosion, resulting in death or serious injury. Before draining fuel, make sure to discharge static electricity by touching the vehicle body.**

**Caution**

- **Because the fuel tank is constructed such that the fuel level is higher than the installation surface of the fuel pump, fuel leakage could occur. If the fuel gauge indicates a fuel level of half or more, perform the following Steps 1-6 to drain approx. 10 L {11 US gal, 8.8 Imp gal} of fuel.**
- **Disconnecting/connecting the quick release connector without cleaning it may possibly cause damage to the fuel pipe and quick release connector. Always clean the quick release connector joint area before disconnecting/connecting using a cloth or soft brush, and make sure that it is free of foreign material.**
- **To prevent the SST from coming off the fuel pump cap while performing the work, always perform the removal/installation procedure with 2 people. One person presses the SST against cap from directly above, while the other person rotates the SST.**

1. Complete the “BEFORE REPAIR PROCEDURE”. (See 01-14-4 BEFORE REPAIR PROCEDURE[L3 WITH TC].)
2. Remove the service hole cover.
3. Remove the rear seat cushion.

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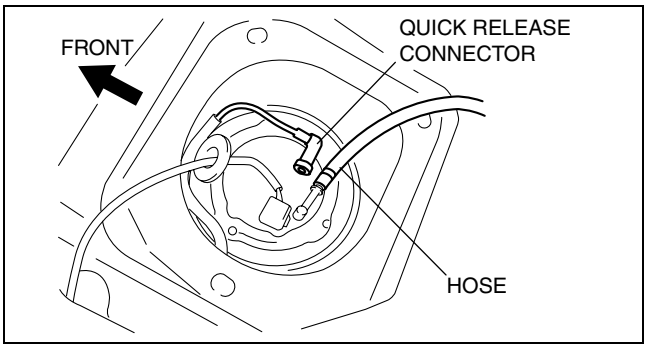
4. Disconnect the quick release connector connected to the fuel pump unit.
5. Connect a long hose to the disconnected quick release connector and drain the fuel into a container used for collecting gasoline.
6. Start the fuel pump using the following procedure.

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**Using M-MDS**

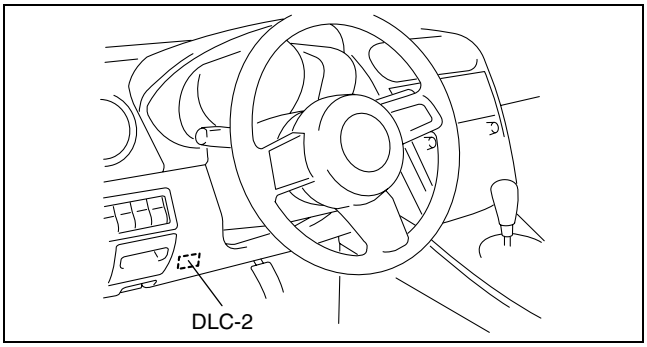
1. Connect the M-MDS to the DLC-2.
2. Using the simulation function “FP”, start the fuel pump.

**Without using M-MDS**

1. Remove the fuel pump relay.

**Caution**

- **Short the specified terminals because shorting the wrong terminal of the main fuse block may cause malfunctions.**

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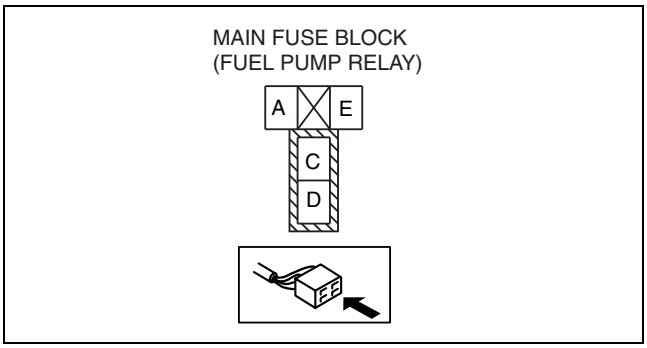
2. Using a jumper wire, short fuel pump relay terminals C and D in the main fuse block.
3. Connect the negative battery cable and operate the fuel pump.

**Caution**

- **The fuel pump could be damaged if it is operated (fuel pump idling) while there is no fuel in the fuel tank. Verify the amount of fuel being discharged from the hose and stop operation of the fuel pump when essentially no fuel is being discharged.**

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7. When essentially no fuel is being discharged, stop the fuel pump.

**Using M-MDS**

1. Using the simulation function “FP”, stop the fuel pump.

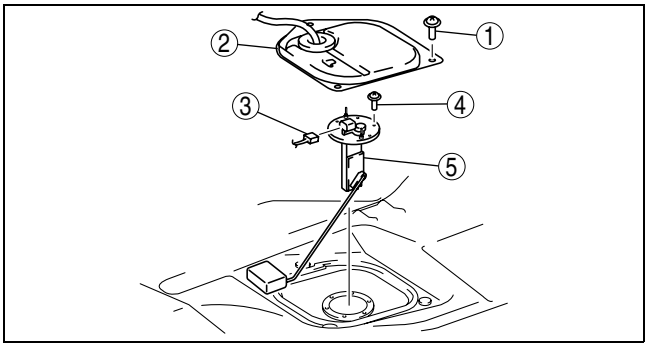
**Without using M-MDS**

1. Turn the ignition switch to LOCK position to stop the fuel pump.
2. Disconnect the jumper wire from the check connector.

8. Disconnect the negative battery cable.

9. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw A |
| 2 | Cover |
| 3 | Connector |
| 4 | Screw B |
| 5 | Fuel gauge sender sub-unit |



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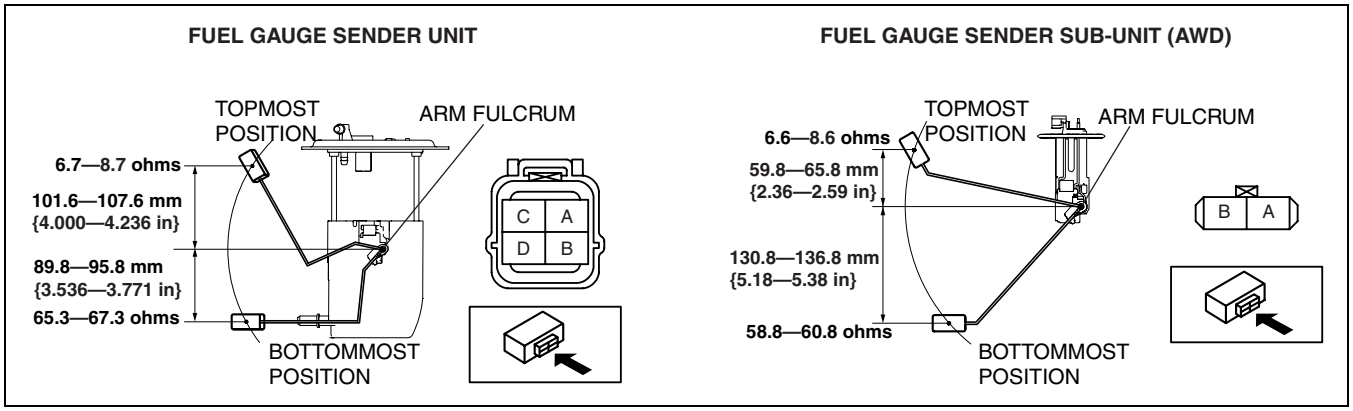
10. Install in the reverse order of removal.
11. Complete the “AFTER REPAIR PROCEDURE”. (See 01-14-4 AFTER REPAIR PROCEDURE[L3 WITH TC].)

**FUEL GAUGE SENDER UNIT INSPECTION**

id092200801800

1. Move the float to the topmost and bottommost positions, and verify that the resistance between terminals A and C (fuel gauge sender unit) or A and B (fuel gauge sender sub-unit) of the unit and the position of the float are as indicated in the figure.



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- If they are not as indicated, replace the fuel gauge sender unit or fuel gauge sender sub-unit.

**OIL PRESSURE SWITCH INSPECTION**

id092200801200

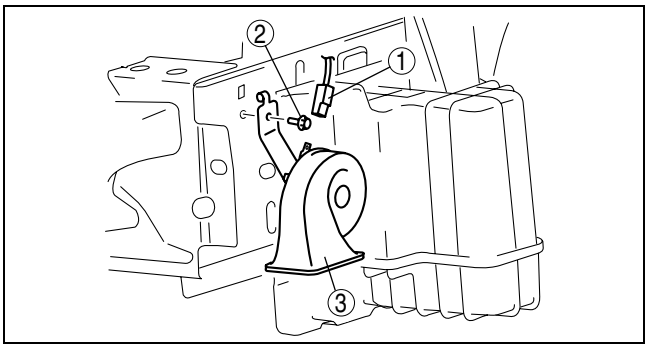
1. Verify that the oil pressure warning light illuminates when the ignition switch is at the ON position.
2. Verify that the oil pressure warning light goes out when the engine is started.
   - If the oil pressure warning light does not illuminate or remains illuminated, inspect the BCM and related wiring harness.
     — If the BCM and related wiring harness are normal, inspect the oil pressure. (See 01-11-2 OIL PRESSURE INSPECTION[L3 WITH TC],)
       - If the oil pressure is normal, replace the oil pressure switch.

**HORN REMOVAL/INSTALLATION**

id092200800900

1. Disconnect the negative battery cable.
2. Slightly bend back the mudguard.
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Connector |
| 2 | Bolt |
| 3 | Horn |



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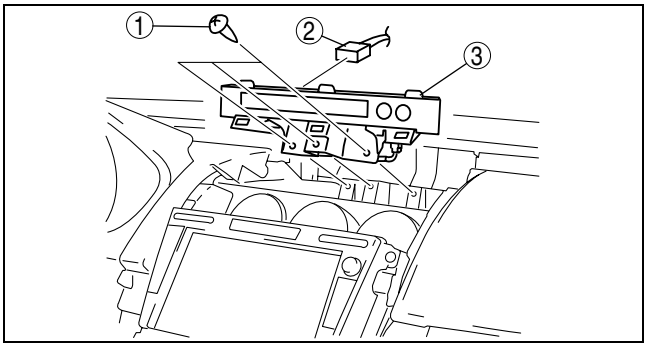
4. Install in the reverse order of removal.

## INFORMATION DISPLAY REMOVAL/INSTALLATION

id092200801400

1. Disconnect the negative battery cable.
2. Remove the following parts:
   (1) Front scuff plate inner (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION.)
   (2) Front side trim (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION.)
   (3) Console panel (See 09-17-15 CONSOLE PANEL REMOVAL/INSTALLATION.)
   (4) Console (See 09-17-13 CONSOLE REMOVAL/INSTALLATION.)
   (5) Hood release lever (See 09-14-25 HOOD LATCH AND RELEASE LEVER REMOVAL/INSTALLATION.)
   (6) Lower panel (See 09-17-9 LOWER PANEL REMOVAL/INSTALLATION.)
3. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Screw |
| 2 | Connector |
| 3 | Information display |

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4. Install in the reverse order of removal.

## INFORMATION DISPLAY INPUT/OUTPUT CHECK MODE

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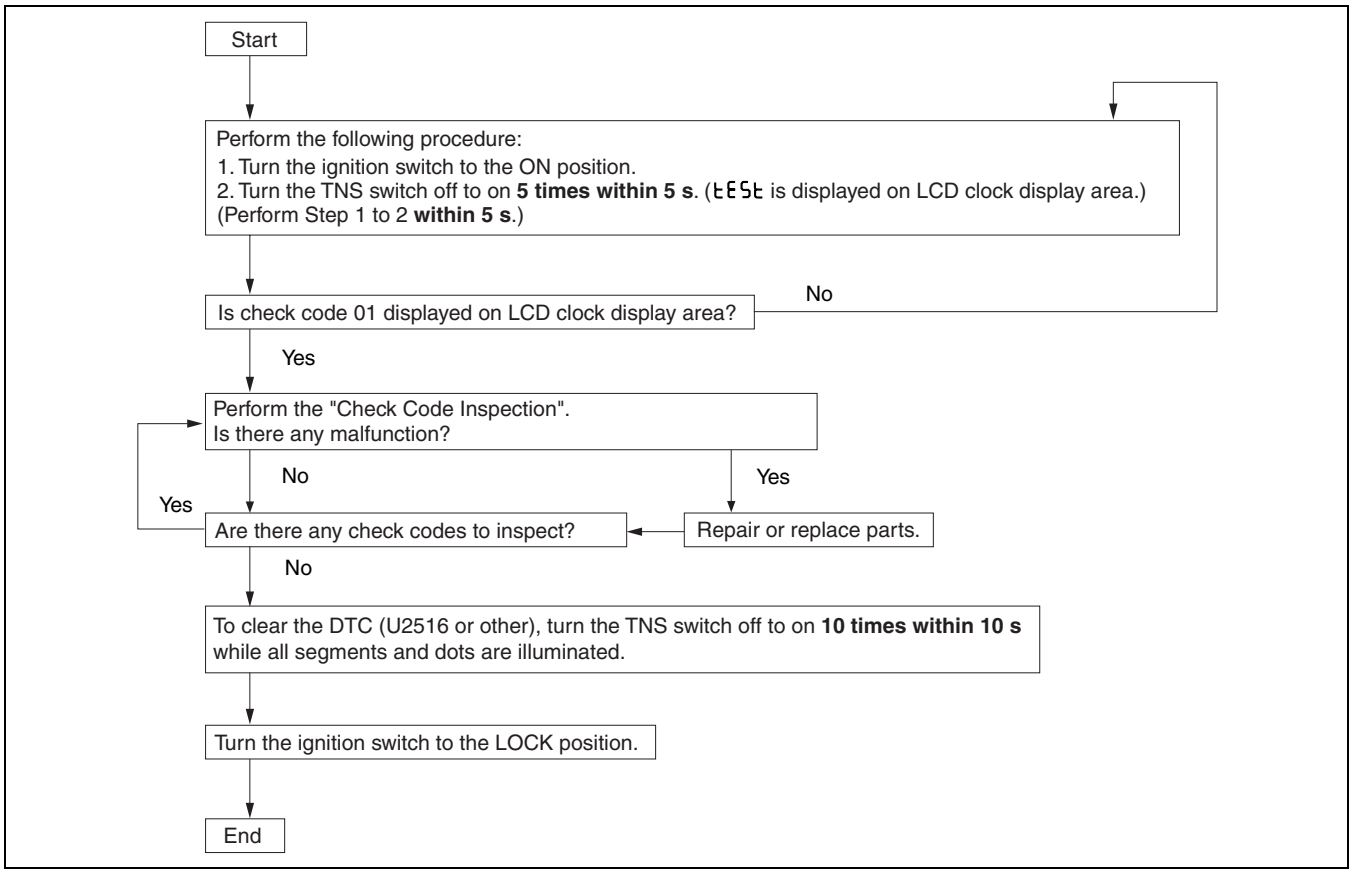
**Note**
- In this mode, it is possible to verify the items in the following chart.

**Check Code Table**

| Check code | Check item | Related items |
|---|---|---|
| 01 | Information display | CAN system<br>• DTC U2516: CAN system communication error |
| 02 | • Audio unit<br>• Climate control unit<br>• Instrument cluster | CAN system<br>• DTCU0184: Communication error to audio unit<br>• DTCU0166: Communication error to climate control unit<br>• DTCU0181: Communication error to instrument cluster |
| 04 | TNS relay | • TNS relay<br>• TNS signal wiring harness |
| — | LCD | LCD |

**Note**
- The check codes are displayed in numerical order. (While performing the inspection, if you want to inspect a check code with a number smaller than the code number you are currently inspecting, terminate the check mode then repeat the inspection from the beginning.)

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**Check Code Inspection**
**Check code 01**

| **Check code 01** | **CAN system** | |
|---|---|---|
| **INSPECTION CONDITION** | **DISPLAY** | **ACTION** |
| Select the check code 01. | OK | CAN system of information display is normal. |
| | U2516 | CAN system communication error. (DTC U2516)<br>(See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |

**Check code 02**

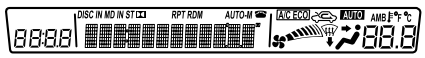
| Check code 02 | • Communication status to audio unit<br>• Communication status to climate control unit<br>• Communication status to instrument cluster |
|---|---|

| INSPECTION CONDITION | DISPLAY | | ACTION |
|---|---|---|---|
| Select the check code 02.<br>(The diagnostic results will be displayed once each in the order of audio unit, heater control unit, and instrument cluster.) | 02 OK | | All communications are normal. |
| | Audio unit | OK ACU | Communication to audio unit is normal. |
| | | U0184 ACU | Communication error to audio unit. (DTC U0184) (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |
| | | None ACU | Vehicle without audio unit. |
| | Climate control unit | OK EATC | Communication to climate control unit is normal. |
| | | U0166 EATC | Communication error to climate control unit. (DTC U0166) (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |
| | | None EATC | Vehicle without climate control unit. |
| | Instrument cluster | OK HEC | Communication to instrument cluster is normal. |
| | | U0181 HEC | Communication error to instrument cluster. (DTC U0181) (See 09-02D-7 DTC TABLE[MULTIPLEX COMMUNICATION SYSTEM]) |

**Check code 04**

| Check code 04 | TNS relay ON/OFF signal | | |
|---|---|---|---|
| **STEP** | **INSPECTION CONDITION** | **DISPLAY** | **ACTION** |
| 1 | Turn the headlight switch to the TNS position. (TNS relay ON) | ON | Go to the next step. |
| | | OFF | Verify that the voltage of information display terminal C is **B+**.<br>• If the voltage is as specified, replace the information display.<br>• If the voltage is not as specified, inspect the following parts:<br>— TNS relay<br>— Wiring harness (Battery— TNS relay— information display) |
| 2 | Turn the headlight switch off. (TNS relay OFF) | ON | Verify that the voltage of the information display terminal C is **1.0 V or less**.<br>• If the voltage is as specified, replace the information display.<br>• If the voltage is not as specified, inspect the following parts:<br>— TNS relay<br>— Wiring harness (TNS relay— information display) |
| | | OFF | Input signal to the information display is normal. |

**LCD**

| Check code — | LCD | |
|---|---|---|
| **DISPLAY** | **ACTION** | |
|  | All segments and dots illuminated. | LCD is normal. |
| | Except above | Replace the information display. |

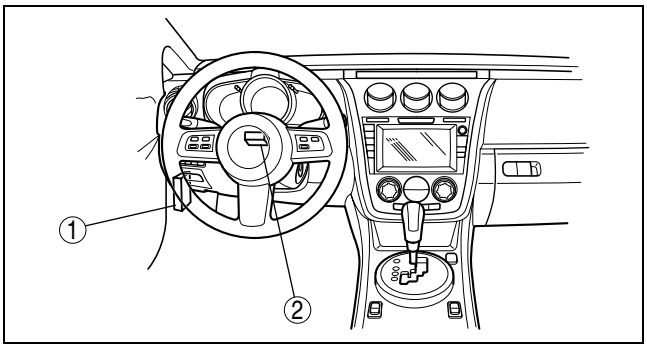
# 09-40 CONTROL SYSTEM

**CONTROL SYSTEM**
**LOCATION INDEX. . . . . 09-40–1**
**BODY CONTROL MODULE (BCM)**
**REMOVAL/INSTALLATION. . . . . 09-40–1**
**BODY CONTROL MODULE (BCM)**
**INSPECTION . . . . . 09-40–2**
Terminal Voltage Table (Reference) **. . . 09-40–2**
**STEERING ANGLE SENSOR**
**INSPECTION . . . . . 09-40–7**
**STEERING ANGLE SENSOR**
**INITIALIZATION PROCEDURE . . . . . 09-40–8**

## CONTROL SYSTEM LOCATION INDEX

id094000801000

| | |
|---|---|
| 1 | BCM<br>(See 09-40-1 BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION.)<br>(See 09-40-2 BODY CONTROL MODULE (BCM) INSPECTION.) |
| 2 | Steering angle sensor<br>(See 09-40-7 STEERING ANGLE SENSOR INSPECTION)<br>(See 09-40-8 STEERING ANGLE SENSOR INITIALIZATION PROCEDURE.) |

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## BODY CONTROL MODULE (BCM) REMOVAL/INSTALLATION

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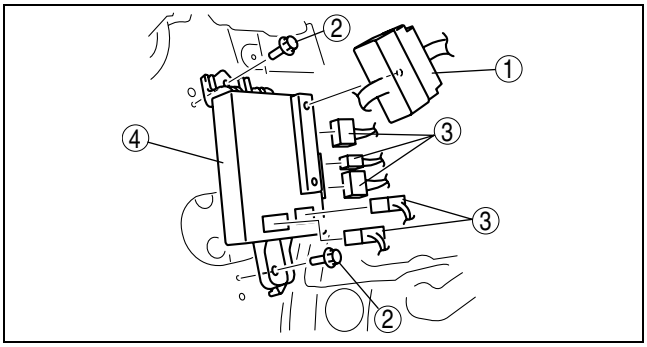
1. Disconnect the negative battery cable.
2. Remove the front scuff plate inner (LH). (See 09-17-19 FRONT SCUFF PLATE REMOVAL/INSTALLATION)
3. Remove the front side trim (LH). (See 09-17-18 FRONT SIDE TRIM REMOVAL/INSTALLATION)
4. Remove in the order indicated in the table.

| | |
|---|---|
| 1 | Wiring harness |
| 2 | Bolt |
| 3 | Connector |
| 4 | BCM |

5. Install in the reverse order of removal.

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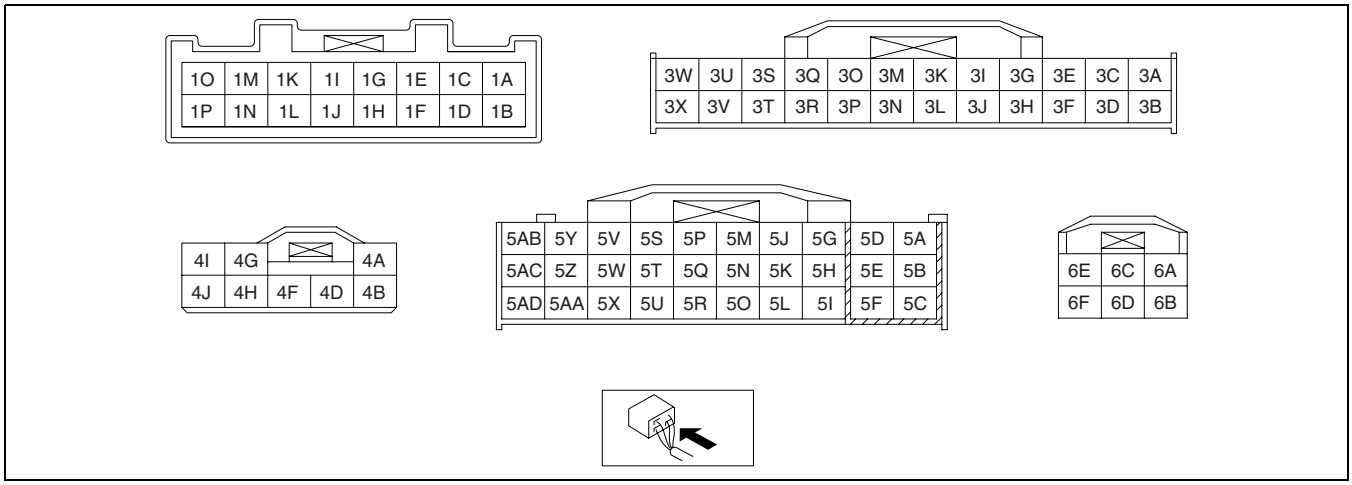
## BODY CONTROL MODULE (BCM) INSPECTION

id094000800300

1. Remove the glove compartment.
2. Remove the BCM with the connector connected.
3. Measure the voltage at each terminal and inspect for the continuity between the terminals and ground is as indicated in the Terminal Voltage Tables (Reference).
   - If the voltage or continuity is not as specified in the Terminal Voltage Table (Reference), inspect the parts under “Inspection item (s)”.
     — If the system does not work properly even though the parts or related wiring harnesses do not have any malfunction, replace the BCM.

### Terminal Voltage Table (Reference)

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| Terminal | Signal | Connected to | Measurement condition | | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|---|
| 1A | Hood latch switch signal | Hood latch switch | Hood open (Hood latch switch off) | | 5 | • Hood latch switch<br>• Related wiring harnesses |
| | | | Hood closed (Hood latch switch on) | | 1.0 or less | |
| 1B | CAN_H | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | | — | • Related wiring harnesses |
| 1C | Parking brake switch signal | Parking brake switch | Ignition switch at ON | Parking brake switch on | 1.0 or less | • Parking brake switch<br>• Related wiring harnesses |
| | | | | Parking brake switch off | B+ | |
| 1D | CAN_L | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | | — | • Related wiring harnesses |
| 1E | Brake fluid level signal | Brake fluid level sensor | Ignition switch at ON | Brake fluid level below MIN. | B+ | • Brake fluid level sensor<br>• Related wiring harnesses |
| | | | | Brake fluid level above MIN. | 1.0 or less | |
| 1F | — | — | — | | — | — |
| 1G | Oil pressure switch signal | Oil pressure switch | Ignition switch at ON | Oil pressure switch on | 1.0 or less | • Oil pressure switch<br>• Related wiring harnesses |
| | | | | Oil pressure switch off | B+ | |
| 1H | Horn control | Horn relay | Transmitter LOCK button is pressed twice **within 5 s**. | | B+ → 1.0 or less → B+ | • Horn relay<br>• Related wiring harnesses |
| | | | Other | | B+ | |
| 1I | Power supply | Main fuse block | Under any condition | | B+ | • Related wiring harnesses |
| 1J | — | — | — | | — | — |

| Terminal | Signal | Connected to | Measurement condition | | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|---|
| 1K | Power door lock power supply | Main fuse block | Under any condition | | B+ | • Related wiring harnesses |
| 1L | Rear washer motor control | Rear washer motor | Ignition switch at ON | Rear washer switch on | 1.0 or less | • Rear washer motor<br>• Related wiring harnesses |
| | | | | Rear washer switch off | B+ | |
| 1M | Front turn light (RH) control | Front turn light (RH) | Turn switch (RH) on | Front turn light (RH) flashes | Alternates between 1.0 or less and B+ | • Front turn light (RH)<br>• Related wiring harnesses |
| | | | Hazard warning switch on | | | |
| | | | Other | | 1.0 or less | |
| 1N | Rear washer motor power supply | Rear washer motor | Ignition switch at ON | | B+ | • Ignition switch<br>• Rear washer motor<br>• Related wiring harnesses |
| | | | Ignition switch off | | 1.0 or less | |
| 1O | Front turn light (LH) control | Front turn light (LH) | Turn switch (LH) on | Front turn light (LH) flashes | Alternates between 1.0 or less and B+ | • Front turn light (LH)<br>• Related wiring harnesses |
| | | | Hazard warning switch on | | | |
| | | | Other | | 1.0 or less | |
| 1P | Back-up light power supply | Back-up light relay | Back-up light on | | B+ | • Back-up light relay<br>• Back-up light<br>• Related wiring harnesses |
| | | | Back-up light off | | 1.0 or less | |
| 3A | Security light control | Instrument cluster | Security light on | | 1.0 or less | • Instrument cluster<br>• Related wiring harnesses |
| | | | Security light off | | B+ | |
| 3B | — | — | — | | — | — |
| 3C | Key reminder switch signal | • Steering lock unit (with advanced keyless system)<br>• Key reminder switch (with keyless entry system) | Key inserted | | B+ | • Steering lock unit (with advanced keyless system)<br>• Key reminder switch(with keyless entry system)<br>• Related wiring harnesses |
| | | | Key removed | | 1.0 or less | |
| 3D | Ignition key illumination power supply | Ignition key illumination | Under any condition | | B+ | • Related wiring harnesses |
| 3E | Ignition key illumination control | Ignition key illumination | Ignition switch off and driver-side door opened. | | 1.0 or less | • Ignition key illumination bulb<br>• Related wiring harnesses |
| | | | **15 s or more** after all doors closed. | | B+ | |
| 3F | Key reminder switch power supply | Key reminder switch | Under any condition | | B+ | • Related wiring harnesses |
| 3G | Serial communication | Keyless control module | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | | — | • Keyless control module<br>• Related wiring harnesses |
| 3H | Horn switch signal | Hor switch | Hor switch off | | B+ | • Hor switch<br>• Related wiring harnesses |
| | | | Hor switch on | | 1.0 or less | |
| 3I | Steering angle sensor GND | Steering angle sensor | Under any condition | | 1.0 or less | • Related wiring harnesses |
| 3J | Hazard warning switch signal | Hazard warning switch | Hazard warning switch on | | 1.0 or less | • Hazard warning switch<br>• Related wiring harnesses |
| | | | Hazard warning switch off | | B+ | |
| 3K | Steering angle sensor signal (Z) | Steering angle sensor | Under any condition: Inspect for continuity to steering angle sensor. | | Continuity detected | • Related wiring harnesses |

| Terminal | Signal | Connected to | Measurement condition | | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|---|
| 3L | Turn switch input (LH) | Turn switch | Ignition switch at ON | Turn switch at left position | 1.0 or less | • Turn switch<br>• Related wiring harnesses |
| | | | | Other | B+ | |
| 3M | Steering angle sensor signal (C) | Steering angle sensor | Under any condition: Inspect for continuity to steering angle sensor. | | Continuity detected | • Related wiring harnesses |
| 3N | Turn switch input (RH) | Turn switch | Ignition switch at ON | Turn switch at right position | 1.0 or less | • Turn switch<br>• Related wiring harnesses |
| | | | | Other | B+ | |
| 3O | Steering angle sensor signal (B) | Steering angle sensor | Under any condition: Inspect for continuity to steering angle sensor. | | Continuity detected | • Related wiring harnesses |
| 3P | — | — | — | | — | — |
| 3Q | Steering angle sensor signal (A) | Steering angle sensor | Under any condition: Inspect for continuity to steering angle sensor. | | Continuity detected | • Related wiring harnesses |
| 3R | Rear wiper switch signal (INT) | Windshield wiper and washer switch | Ignition switch at ON | Rear wiper switch at INT position | 1.0 or less | • Wiper and washer switch<br>• Related wiring harnesses |
| | | | | Other | B+ | |
| 3S | Steering angle sensor power supply | Steering angle sensor | **Fifteen hours** after key removed and all doors closed. | | approx. 2.5 | • Steering angle sensor<br>• Related wiring harnesses |
| | | | Other | | 5 | |
| 3T | Rear wiper switch signal (on) | Windshield wiper and washer switch | Ignition switch at ON | Rear wiper switch at ON position | 1.0 or less | • Wiper and washer switch<br>• Related wiring harnesses |
| | | | | Other | B+ | |
| 3U | BCM GND | Body ground | Under any condition: Inspect for continuity to ground. | | Continuity detected | • Related wiring harnesses |
| 3V | A/C on request signal | Climate control unit (manual air conditioner) | A/C on | | 1.0 or less | • Climate control unit (manual air conditioner)<br>• Related wiring harnesses |
| | | | A/C off | | 5 | |
| 3W | CAN_H | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | | — | • Related wiring harnesses |
| 3X | CAN_L | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | | — | • Related wiring harnesses |
| 4A | BCM GND | Body ground | Under any condition: Inspect for continuity to ground. | | Continuity detected | • Related wiring harnesses |
| 4B | Tail light power supply | TNS relay | Light switch at TNS position | | B+ | • TNS relay<br>• Related wiring harnesses |
| | | | Light switch at OFF position | | 1.0 or less | |
| 4D | Rear wiper and washer power supply | • Fuse block<br>• Rear wiper motor | Ignition switch at ON | | B+ | • Ignition switch<br>• Rear wiper motor<br>• Related wiring harnesses |
| | | | Ignition switch off | | 1.0 or less | |
| 4F | Rear washer switch signal | Windshield wiper and washer switch | Ignition switch at ON | Rear washer switch on | 1.0 or less | • Windshield wiper and washer switch<br>• Related wiring harnesses |
| | | | | Rear washer switch off | B+ | |
| 4G | — | — | — | | — | — |
| 4H | Heated outer mirror power supply | Rear window defloster relay | Rear window defloster relay on | | B+ | • Rear window defloster relay<br>• Related wiring harnesses |
| | | | Rear window defloster relay off | | 1.0 or less | |
| 4I | BCM power supply | Fuse block | Under any condition | | B+ | • Ignition switch<br>• Related wiring harnesses |
| 4J | BCM power supply | Fuse block | Under any condition | | B+ | • Related wiring harnesses |

| Terminal | Signal | Connected to | Measurement condition | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|
| 5A | Driver-side door key cylinder switch signal | Driver-side door key cylinder switch | At the moment key cylinder is unlocked | 1.0 or less | • Driver-side door key cylinder switch<br>• Related wiring harnesses |
| | | | At the moment key cylinder is locked | 2.5 | |
| | | | Other | 5 | |
| 5B | Serial communication | • Power window main switch<br>• Sunroof motor | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | — | • Power window main switch<br>• Sunroof motor<br>• Related wiring harnesses |
| 5C | CAN_L | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | — | • Related wiring harnesses |
| 5D | Lock/unlock input (rear door lock-link switch (LH)) | Rear door lock-link switch (LH) | Rear door (LH) locked | 5 | • Rear door lock-link switch (LH)<br>• Related wiring harnesses |
| | | | Rear door (LH) unlocked | 1.0 or less | |
| 5E | Lock/unlock input (rear door lock-link switch (RH)) | Rear door lock-link switch (RH) | Rear door (RH) locked | 5 | • Rear door lock-link switch (RH)<br>• Related wiring harnesses |
| | | | Rear door (RH) unlocked | 1.0 or less | |
| 5F | CAN_H | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | — | • Related wiring harnesses |
| 5G | Lock input (Driver-side door lock-link switch) | Driver-side door lock-link switch | Driver-side door locked | 1.0 or less | • Driver-side door lock-link switch<br>• Related wiring harnesses |
| | | | Driver-side door unlocked | 5 | |
| 5H | Lock/unlock input (passenger-side door lock-link switch) | Passenger-side door lock-link switch | Passenger-side door locked | 1.0 or less | • Passenger-side door lock-link switch<br>• Related wiring harnesses |
| | | | Passenger-side door unlocked | 5 | |
| 5I | CAN_L | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | — | • Related wiring harnesses |
| 5J | Unlock input (Driver-side door lock-link switch) | Driver-side door lock-link switch | Driver-side door locked | 5 | • Driver-side door lock-link switch<br>• Related wiring harnesses |
| | | | Driver-side door unlocked | 1.0 or less | |
| 5K | — | — | — | — | — |
| 5L | CAN_H | — | Because this terminal is for communication, good/no good judgment by terminal voltage is not possible. | — | • Related wiring harnesses |
| 5M | Lock/unlock signal | Door lock switch (driver-side) | Door lock switch (driver-side) is pressed to lock. | 2.5 | • Door lock switch (driver-side)<br>• Related wiring harnesses |
| | | | Door lock switch (driver-side) is pressed to unlock. | 1.0 or less | |
| | | | Other | 5 | |
| 5N | Lock/unlock signal | Door lock switch (passenger-side) | Door lock switch (passenger-side) is pressed to lock. | 2.5 | • Door lock switch (passenger-side)<br>• Related wiring harnesses |
| | | | Door lock switch (passenger-side) is pressed to unlock. | 1.0 or less | |
| | | | Other | 5 | |

| Terminal | Signal | Connected to | Measurement condition | | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|---|
| 5O | Rear turn light (RH) control | Rear turn light (RH) | Turn switch (RH) on<br>Hazard warning switch on | Rear turn light (RH) flashes | Alternates between 1.0 or less and B+ | • Reat turn light (RH)<br>• Related wiring harnesses |
| | | | Other | | 1.0 or less | |
| 5P | Liftgate latch switch signal | Liftgate latch switch | Liftgate is open. (Liftgate latch switch off) | | B+ | • Liftgate latch switch<br>• Related wiring harnesses |
| | | | Liftgate is closed. (Liftgate latch switch on) | | 1.0 or less | |
| 5Q | — | — | — | | — | — |
| 5R | Rear turn light (LH) control | Rear turn light (LH) | Turn switch (LH) on<br>Hazard warning switch on | Rear turn light (LH) flashes | Alternates between 1.0 or less and B+ | • Reat turn light (LH)<br>• Related wiring harnesses |
| | | | Other | | 1.0 or less | |
| 5S | Rear door switch (LH) signal | Rear door switch (LH) | Any rear doors open (Rear door switch on) | | 1.0 or less | • Rear door switches<br>• Related wiring harnesses |
| | | | All rear doors closed (Rear door switch off) | | B+ | |
| 5T | Rear door switch (RH) signal | Rear door switch (RH) | Any rear doors open (Rear door switch on) | | 1.0 or less | • Rear door switches<br>• Related wiring harnesses |
| | | | All rear doors closed (Rear door switch off) | | B+ | |
| 5U | Back-up light (RH) control | Back-up light (RH) | Back-up light on | | B+ | • Back-up light relay<br>• Back-up light (RH)<br>• Related wiring harnesses |
| | | | Back-up light off | | 1.0 or less | |
| 5V | Front door switch (passenger-side) signal | Front door switch (passenger-side) | Front door (passenger-side) open (Front door switch (passenger-side) on) | | 1.0 or less | • Front door switch (passenger-side)<br>• Related wiring harnesses |
| | | | Front door (passenger-side) closed (Front door switch (passenger-side) off) | | B+ | |
| 5W | — | — | — | | — | — |
| 5X | Back-up light (LH) control | Back-up light (LH) | Back-up light on | | B+ | • Back-up light relay<br>• Back-up light (LH)<br>• Related wiring harnesses |
| | | | Back-up light off | | 1.0 or less | |
| 5Y | Front door switch (driver-side) signal | Front door switch (driver-side) | Front door (driver-side) open (Front door switch (driver-side) on) | | 1.0 or less | • Front door switch (driver-side)<br>• Related wiring harnesses |
| | | | Front door (driver-side) closed (Front door switch (driver-side) off) | | B+ | |
| 5Z | — | — | — | | — | — |
| 5AA | Heated outer mirror control | Heated outer mirror (driver-side) | Rear window defloster relay on | | B+ | • Rear window defloster relay<br>• Heated outer mirror (driver-side)<br>• Related wiring harnesses |
| | | | Rear window defloster relay off | | 1.0 or less | |
| 5AB | Tail light (RH) control | • License plate light (RH)<br>• Tail light (RH)<br>• Rear side marker light (RH) | Light switch at TNS position | | B+ | • License plate light (RH)<br>• Taillight (RH)<br>• Rear side marker light (RH)<br>• Related wiring harnesses |
| | | | Light switch at OFF position | | 1.0 or less | |
| 5AC | Tail light (LH) control | • License plate light (LH)<br>• Tail light (LH)<br>• Rear side marker light (LH) | Light switch at TNS position | | B+ | • License plate light (LH)<br>• Taillight (LH)<br>• Rear side marker light (LH)<br>• Related wiring harnesses |
| | | | Light switch at OFF position | | 1.0 or less | |

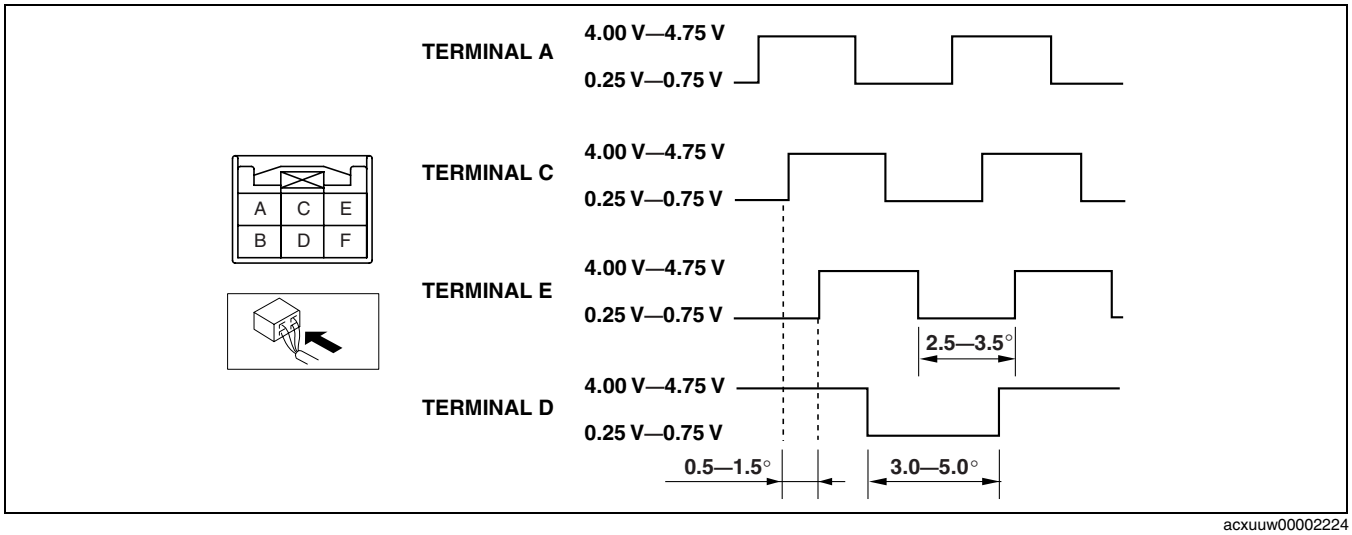
| Terminal | Signal | Connected to | Measurement condition | Voltage (V)/ Continuity | Inspection item (s) |
|---|---|---|---|---|---|
| 5AD | Heated outer mirror control | Heated outer mirror (passenger-side) | Rear window defloster relay on | B+ | • Rear window defloster relay<br>• Heated outer mirror (passenger-side)<br>• Related wiring harnesses |
| | | | Rear window defloster relay off | 1.0 or less | |
| 6A | Rear wiper control | Rear wiper motor | Rear wiper moving | 1.0 or less | • Rear wiper motor<br>• Related wiring harnesses |
| | | | Rear wiper stopped | B+ | |
| 6B | Interior light control | • Map light<br>• Interior light | **Within 5 min** after any door is opened. | 1.0 or less | • Map light<br>• Interior light<br>• Related wiring harnesses |
| | | | **5 min or more** after any door is opened. | B+ | |
| | | | All doors closed | B+ | |
| 6C | Driver-side door unlock control | Driver-side door lock actuator | Driver-side door lock actuator unlocking | 1.0 or less → B+ → 1.0 or less | • Driver-side door lock actuator<br>• Related wiring harnesses |
| | | | Other | 1.0 or less | |
| 6D | Interior light power supply | • Map light<br>• Interior light | Under any condition | B+ | • Map light<br>• Interior light<br>• Related wiring harnesses |
| 6E | Door lock control | Door lock actuators | Door lock actuators locking | 1.0 or less → B+ → 1.0 or less | • Door lock actuators<br>• Related wiring harnesses |
| | | | Other | 1.0 or less | |
| 6F | Door unlock control | Door lock actuators | Door lock actuators unlocking | 1.0 or less → B+ → 1.0 or less | • Door lock actuators<br>• Related wiring harnesses |
| | | | Other | 1.0 or less | |



### STEERING ANGLE SENSOR INSPECTION

id094000801100

1. Remove the column cover. (See 09-17-8 COLUMN COVER REMOVAL/INSTALLATION.)
2. Turn the steering wheel to the right and left, and verify that the voltage and pulses at the terminals are as shown in the figure.
   - If not as specified, replace the steering angle sensor.

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## STEERING ANGLE SENSOR INITIALIZATION PROCEDURE

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**Warning**

- **If the steering angle sensor reference point setting is not completed, it could result in an unexpected accident due to the related systems being inoperative.. Therefore, if the BCM connector or negative battery cable are disconnected, or the BCM power supply is interrupted, always perform the steering angle sensor reference point setting and verify that each system is operational.**

**Note**

- The BCM stores the steering angle reference point using battery power supply. Therefore, if the following operations are performed and the power supply to the BCM is interrupted, the stored steering angle reference point will be erased.
  - — The negative battery cable is disconnected
  - — The steering angle sensor connector is disconnected
  - — A fuse (ROOM) is removed
  - — The wiring harness between the BCM and steering angle sensor connector is disconnected

1. Inspect the wheel alignment, inflation pressure, and the installation condition of the steering wheel.
   - If there is any malfunction, adjust the applicable part.
2. Connect the negative battery cable.
3. Turn the ignition switch to the ON position.
4. Confirm that the DSC/TCS indicator light illuminates and that the TCS OFF light flashes.
5. Turn the steering wheel to full right lock, then turn it to full left lock.
6. Confirm that the TCS OFF light goes out.
7. Turn the ignition switch off.
8. Turn the ignition switch to the ON position again, and confirm that the DSC/TCS indicator light goes out.
   - If the DSC/TCS indicator light does not go out, disconnect the negative battery cable, and perform the procedure again starting from Step 2 shown above.
9. Drive the vehicle for **approx. 10 min**, and confirm that the ABS warning and DSC/TCS indicator lights do not illuminate.

# 09-50 TECHNICAL DATA

**BODY AND ACCESSORIES**
**TECHNICAL DATA . . . . . 09-50–1**

## BODY AND ACCESSORIES TECHNICAL DATA

id095000800100

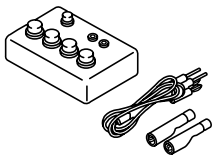
| Item | | Specifications (W) × number |
|---|---|---|
| Exterior light bulb capacity | Headlight bulb (high-beam) | 60 × 2 |
| | Discharge headlight bulb (low-beam) | 35 × 2 |
| | Halogen headlight bulb (low-beam) | 55 × 2 |
| | Front turn/parking light bulb | 21/5 × 2 |
| | Front side marker light bulb | 5 × 2 |
| | Front fog light bulb | 55 × 2 |
| | Brake light/taillight bulb | 21/5 × 2 |
| | Rear turn light bulb | 21 × 2 |
| | Back-up light bulb | 21 × 2 |
| | Rear side marker light bulb | 5 × 2 |
| | License plate light bulb | 5 × 2 |
| | High-mount brake light bulb (LED) | 2.4 |
| Interior light bulb capacity | Map light bulb | 5 × 2 |
| | Interior light bulb | 10 × 1 |
| | Cargo compartment light bulb | 8 × 1 |
| | Ignition key illumination bulb | 1.4 × 1 |

# 09-60 SERVICE TOOLS

**BODY AND ACCESSORIES SST . . . . . 09-60–1**

## BODY AND ACCESSORIES SST

id096000800100

| | | |
|---|---|---|
| 49 N088 0A0<br><br>Fuel and Thermometer checker  | - | - |

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